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Indexed in the Industrial Arts Index. Published every Thursday. Subscription Price North America, South America and U. S. Possessions, $8; Foreign, $15 per year. Single Copy, 35 cents.

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Cable Address, "Ironage" N. Y.

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How Ryerson Alloys
Protect Your Production

Every Department is Served

When your shipment of Ryerson alloy steels arrives, complete test data comes with them—data that enables engineers and designers to call for the physical properties listed, with confidence that they can be secured—that furnishes heat treaters with a guide to sure, accurate results and provides a detailed record for your purchasing executive.

As a part of the Ryerson Certified Steel Plan, this data is developed from actual laboratory tests. In addition to mill tests for chemical analysis and physical characteristics, Ryerson subjects samples from each alloy heat to four end-quench hardenability tests. From hardness readings of the test samples we interpret obtainable physical properties for various size rounds in the as-quenched condition and when quenched and drawn at 1000°, 1100° and 1200° F.

This test data comes with alloys which are identified by heat symbol as well as by color marking. And to make doubly certain that you get the right steel Ryerson checks against mixed shipments by spark testing all alloys in stock.

Ryerson alloy service costs you nothing extra. It protects your products and production. It saves time and money. It is furnished by 11 Ryerson Steel-Service Plants, each located in a major industrial area. The Ryerson alloy plan is explained in detail in our booklet "Interpreting Hardenability". If you did not receive a copy write today. And get in touch with your nearest Ryerson plant when you need alloy steel from stock.

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The
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Wages and Hours on Steel

THERE is one basic fact that must be considered by management, labor and the public in connection with this present postwar wage-hour controversy. And that is that both profits and wages hinge on productivity. In other words, you cannot have more than you make.

Most of us would like to shut our eyes and ears to this cold but very real fact and think that we can pattern a new world without recourse to arithmetic.

All gains in industry, and indeed in any field of effort, come from increased productivity per hour. You cannot take out of any hour more than you put into it.

The average increase of industrial productivity per hour in this country has been approximately 2 pct per year. This means that we can double our standard of living every fifty years.

Popular notions about the amount we have increased productivity per hour during the war are erroneous. In the steel industry, for example, the increase per hour per hourly-paid wage earner has been 9.5 pct between 1939 and 1944 inclusive or a little less than 2 pct. Against this, the earnings per hour of hourly-paid wage earners in the industry were increased 38.8 pct during this period or over four times as much as productivity.

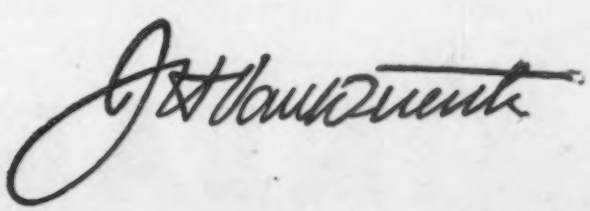
It is true that annual production increased faster than this but that came from longer hours and more producers.

These basic facts must be kept in mind in considering present day wage demands. No matter how much we would like to see wage purchasing power increased, it cannot be at a faster rate than that of productivity.

The best way for labor and management in the steel and automobile industries to get together is through common sense bargaining without bludgeoning. The best way to keep them together after they get together is to see to it that both sides live up to the bargain made.

However, since steel and the automobile industry are such predominant American pace-setters, any bargain made must be in the best interest of all labor and all of the public and not such as to elevate any minority group to the detriment of other minorities or of the majority. Thus the pattern established must be one that falls within the limits of a liquid economy and must be capable of being financed out of earnings and not from debt or nonrecurrent savings.

Management in both industries is fully aware of the economic value of high wages and has fully demonstrated this in payroll performance. It realizes its obligations to continue to pass on to labor, to stockholders and to the plant equipment so vital to both, their proper shares of future increased earnings as they develop through increased productivity. But management cannot count its chickens before they are hatched nor can it, in public interest, literally "shoot the works" on the gamble that four years of wealth destruction through war can boost us all upstairs into a higher living level. Future productivity and future efficiency alone will determine that. So let's get to work and find out how much larger pie we can bake before we attempt to slice it.



HOW TO DEVELOP LOWER DELIVERED COSTS OF STEEL

Here Is a Cost Factor Worth Checking

Steel is a low cost large tonnage product when compared with other metals. But the net cost delivered alongside your machinery and equipment varies greatly in different plants depending upon the mill methods of packing and shipping — and the manufacturers' methods of receiving and handling.

Inland metallurgists control quality from the ore to the finished product . . . but the preservation of that quality is still another factor in final machine side delivery.

So Inland shipping experts prepare the steel with care and pack it for safe arrival and quick economical receiving and handling.

But there are so many types of equipment that may be used in receiving and handling that it is important that the shipping and receiving methods dovetail in order to secure the lowest possible costs. To develop this teamwork between us, it is often advisable to compare notes.

Inland shippers are available to consult with you at any time and make recommendations toward the lowering of your final machine side cost of steel.

Inland Steel Company, 38 South Dearborn Street, Chicago 3, Ill. Sales Offices: Cincinnati, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul. Principal Products: Bars • Structurals • Plates • Sheets • Strip • Tin Plate • Floor Plate • Piling • Reinforcing Bars • Rails • Track Accessories

INLAND STEEL

The IRON AGE
Nov. 13, 1945

NEWSFRONT

► A precision casting pilot plant operating at the International Nickel Co's Bayonne foundry is turning out high nickel alloy castings of Monel, Inconel and nickel at the rate of 500 per week. Castings weighing up to 3 lb each are now being produced.

► Radar is soon to be used as a train protective control mechanism. The Sperry Gyroscope Co. has recently established a new division to handle this development in which most railroads are said to be interested.

► The most useful NE steels are about to be adopted by the SAE into its standard steel classification for postwar use.

Of these, NE 8600 and NE 8700 differ only in molybdenum content in which there is some overlapping. Some consumers who have placed orders for both steels in order to compare claim to have discovered that the producer melted both steels from a single composition, holding molybdenum in the overlapping range.

► A new welding rod has been developed for making machinable welds in cast iron.

► Corrosion studies of lacquered blackplate used as ends of food cans show that cold-reduced plate is superior to hot-rolled plate. Phosphating does not reduce the rate of internal corrosion and may even increase it if adherence of the lacquer to the surface of the plate is not good.

Substitution of blackplate for tinplate ends does not affect the color and flavor of vegetables if the lacquer protection is of average efficiency. The substitution is much less satisfactory with fruits.

► Application of electroplating finishes to beryllium copper eliminates blackening of the alloy under normal conditions and the formation of verdigris when parts become contaminated with fatty acids, polishing compounds or acid atmospheres of high humidity.

► For galvanized steel welds of highest tensile strength, spot welding machines should be set for a short sharp heat with mechanical pressure applied as soon as the electrode comes down.

A short sharp heat minimizes loss through volatilization and does not allow enough time for the formation or diffusion of zinc-iron alloy inside the weld.

► Dominant factors governing the manner of descent of materials charged into a cupola are the shape and size of the metallic pieces in the charge and not its original relative position, British investigations indicate.

Rate of complete melting of metal pieces is also governed in the main by shape and weight as well as by their relative melting temperatures.

► Production of Mercury cars has begun at Dearborn and will follow at Chicago and Edgewater. Mechanical improvements include tri-alloy bearings, crankcase ventilation, improved oil pump, four-ring aluminum pistons and interchangeable cylinder heads.

► The British temporary housing program involves 123,000 units in eight construction types. One type employs asbestos siding over a steel framework. Another is prefabricated all-aluminum. Other constructions employ asbestos and timber framing, reinforced concrete, all-wood construction, and there are relatively small numbers of all-steel and steel framework designs.

The long term British plan is 4 million permanent homes to be constructed over the next 10 yr.

► Arrangements for the first cash sale of steel to foreign governments since the end of Lend-Lease have been concluded in a $2 million deal with the French and Russian governments.

► A new Boeing long-range carrier fighter XF8B-1 equipped with an internal bomb-bay and adaptable to service as a torpedo plane has been unveiled. As a fighter, the plane has a top speed of 425 mph with military power, in excess of 450 mph with war emergency power.

Precision Casting With Plastic Patterns

By CHARLES T. POST
Chicago Editor, THE IRON AGE

. . . Use of injection molded polystyrene patterns overcomes the problems of perishability found with wax patterns while affording high dimensional accuracy, smooth finish and reproducibility on long runs.

ACHIEVEMENT of dimensional accuracy in the lost wax precision casting process mated with reproducibility on longer production runs has posed a multitude of problems to castings manufacturers. These problems have sired intensive research into pattern materials obviating many of these difficulties, with polystyrene, and more recently other styrol resins, heading the procession.

Precision casting at the Illinois Precise Casting Co., 613 West 16th St., Chicago 16, of which Leonard W. Dean is research and development engineer, has demonstrated the virtues of polystyrene patterns in mass precision castings production. Inherent virtues of this thermoplastic can be gleaned from the textbooks (see accompanying table).

Polystyrene is supplied under various trade names by several companies including Bakelite Corp., the Dow Chemical Co., Monsanto Chemical Co., Catalin Corp., Union Carbide & Carbon Corp., and American Phenolic Corp. Another styrol resin, Styramic, produced by Monsanto, figures in current pattern experiments. Polystyrene sells for about 27¢ per lb at Chicago.

Tolerances of ±0.0005 in. have been achieved on small parts on production contracts, with tolerances of ±0.002 common on larger castings. (See Fig. 1.) Production tolerances with wax usually range from ±0.002 in. to ±0.003 in.

Shrinkage, although varying with the part being produced, is said to cause fewer headaches in pattern design.

Perishability of polystyrene patterns is practically nil. Kid-glove handling, necessary for wax patterns is entirely eliminated, reducing scrap and saving time in the production process. Completed wax patterns commonly are individually placed with great care prior to assembly of patterns for investment. Polystyrene patterns may be tossed into a box as they come from the injection molding machine. Care also must be taken in assembling wax patterns for spruing to avoid bending or breaking while polystyrene patterns will stand considerable man-handling with resultant time saving factors. This hardiness also eliminates chipping which has constituted a production obstacle with wax. Intricate coring is simplified.

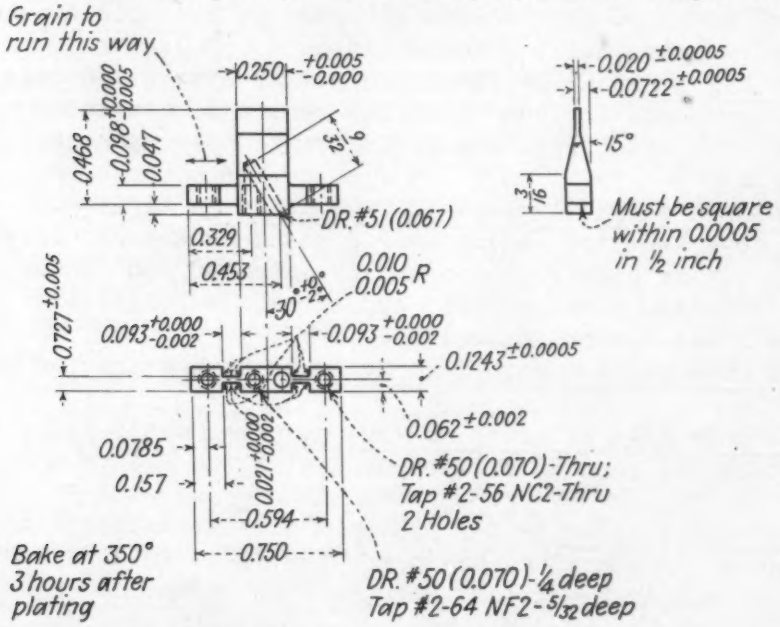
Close temperature and humidity control necessary to maintain close tolerances with wax and to prevent warpage virtually is eliminated with polystyrene.

Polystyrene finds its forte in longer production runs which can be achieved with maintenance of dimensional accuracy due in part to the use of steel dies in injection molding the patterns. Softer metals often used in molding wax patterns have a shorter die life.

Ease of handling in evacuating patterns from the molds prior to casting also is set forth as a polystyrene plus point.

Cost of setting up for production of polystyrene patterns limits their field to longer production runs and parts requiring extreme dimensional accuracy. Heavy capital charges are involved in injection molding machines necessary to produce the patterns. Sinking of steel molding dies to maintain dimensional accuracies required

FIG. 1—With polystyrene patterns tolerances can be held as close as ±0.0005 in. on small parts. The specification below for this tolerance on a square section indicates the degree of dimensional accuracy obtainable with these patterns.



RIGHT

FIG. 2—Typical assortment of parts cast by Illinois Precise Casting Co. using polystyrene patterns.

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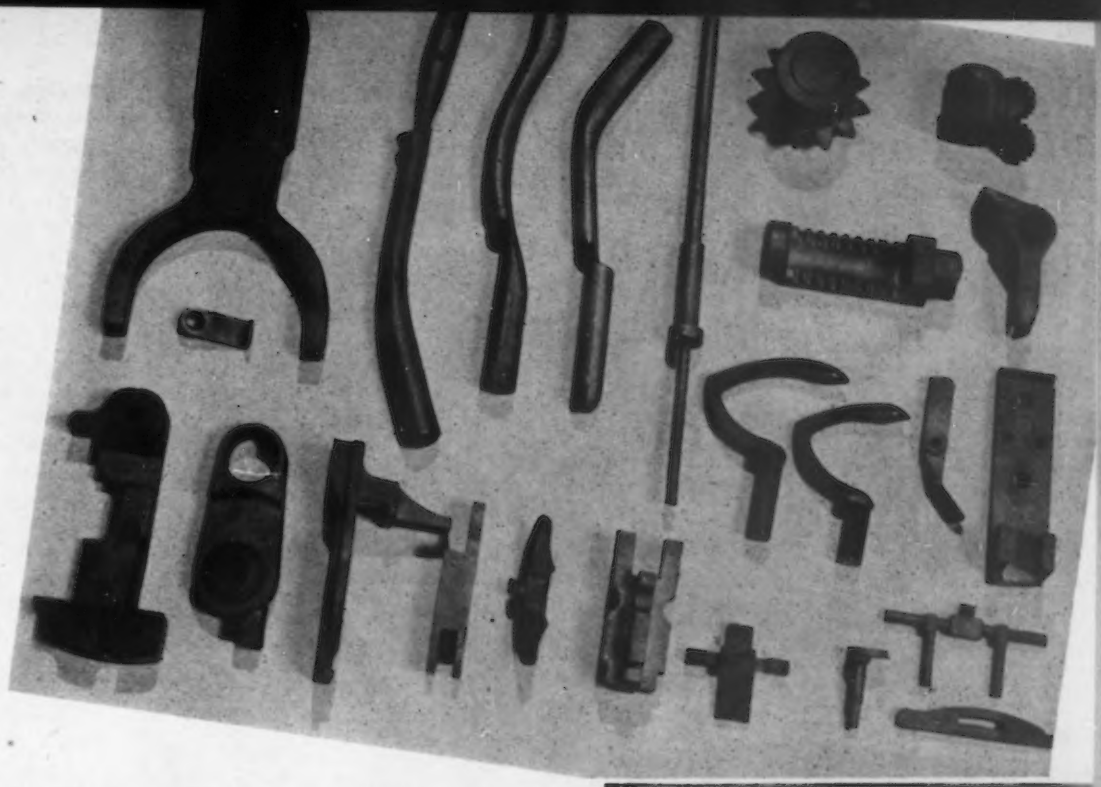
LOWER RIGHT

FIG. 3 — Operator removes polystyrene pattern from two cavity die on HPM injection molding press. Note extractor and ejector pins.



is an intricate and expensive problem of design and technique requiring skilled tool and die makers rather than basement mechanics. This fact alone limits polystyrene patterns to parts intricate in design and close in tolerance or those scheduled for long production runs. Although Illinois Precise Casting Co. has made production runs of as low as 200 pieces on intricate, close-tolerance parts, eliminating heavy machining costs, minimum production runs normally are about 5000 pieces. On short runs, the company has used bronze injection molding dies instead of steel. Longest production run to date on any one part has been 100,000 pieces but schedules are pending for several times this amount.

Experimental runs have been made on such small castings as phonograph needles. The upper limit of the castings produced is about ¾ lb. From one to 40 parts have been produced in a single 3-in. mold. The company is developing a casting machine and mold capable of casting 5 lb of steel, raising the maximum number of parts per cast correspondingly. Chemical analysis has been held to close limit with alloys sometimes added to the melts by tenths of grams. Grain structure in the casting of steel has been gratifying.

Excepting precious metals and mag-

FIG. 4—Pouring investment material on vibrating tables eliminates porosity and assures firm molding of investment around pattern.

FIG. 5—Worker places asbestos lined stainless steel flask over polystyrene pattern prior to pouring investment. At left are polystyrene bases prior to assembly of pattern clusters.

FIG. 6—Centrifugal casting machine at end of casting cycle showing, at left, the flask in a horizontal position adjacent to the crucible emptied of steel. At the beginning of the cycle the crucible is withdrawn to the right and an induction coil placed over it. The coil is then raised and the crucible thrust to the left adjacent to the flask. Centrifugal action throws metal from the crucible into the mold cavity in the flask. Operation is automatic.

Physical Properties of Molded Polystyrene

Physical (Molded) Properties	Compression	Injection
Specific gravity = 1.07		
Tensile strength (psi)	5500 to 6500	6500 to 7000
Impact strength, Izod (ft-lb energy to break)	0.20 to 0.35	0.4 to 0.6
Flexural strength (psi)	6500 to 7500	14,000 to 19,000
Modulus of elasticity (psi)	0.4 to 0.6 x 10^6	0.375 to 0.425 x 10^6
Shrinkage (in. per in.)	0.004 to 0.005	0.002 to 0.008
Distortion under heat	175°F	
Water absorption (318 hr, 2½ in. disk)	0.05 pct	
Index of refraction	1.592 to 1.597	
Rockwell hardness	M85-M92	
Thermal coefficient of linear expansion (per 1°C)	65 to 75 x 10^{-6}	
Heat resistance, 150° to 170°F depending upon particular piece.		

nesium, casting materials have run the metallurgical gamut. Aluminum, copper, brass, bronze, gray iron, Armco iron, 303, 304, 403, 410, 416, 25-12, 18-8 stainless steels, Alnico, Colmonoy, Stellite, 1020, 1050, 4140, 4150, 8630, 8617, tool and die steels of various types, gear steels and vanadium steel are among metals cast. Emphasis is on nonmachinable alloys.

Close production control with production runs preceded by pilot trials is relied on to maintain standards. Laboratory and production equipment at Illinois Precise comprises a HPM injection molding machine, 12 centrifugal casting machines, capable of handling together 150 molds an hr, one 35 kw and five 20 kw induction melting units, along with accessory production equipment. The firm maintains its own die shop because of the difficulty in procuring commercial dies suitable for injection molding of patterns.

Other dimensional accuracies achieved include class 2 external threads, holes to 0.020 in., and surfaces from 10 to 20 m.

Production has been dominated by ordnance parts including parts for the 30 mm carbine, cocking forks, sight leaf slides for the 30 cal machine gun, torpedo parts, land and sea mine parts and rocket parts. Civilian products in production and representing possible fields include cutting tools, small die inserts, gun parts, radio and phonograph parts, small gears, sewing machine, typewriter and adding machine parts, and Tom Thumb intricacies for all types of equipment (fig. 2). Screw machine and punch press parts are not considered a fertile field.

Machining Master Patterns

The casting production cycle with polystyrene patterns forks from the lost wax path in the initial stages, rejoining it following evacuation of the pattern from the mold. Use of hard steel injection molding dies makes it impossible to produce a master mold direct from the part to be produced as is sometimes done with soft metal master molds used in the lost wax process. On simpler parts with liberal tolerances it is often possible to machine a master polystyrene pattern direct from polystyrene bar stock and then precision cast steel die cavities. High machinability of polystyrene makes this possible. For the more intricate pieces, molding dies must be designed and sunk using blueprints of the part to be manufactured as a starting point. With a few exceptions, the general principles govern-

ing molding die design and construction prevail.

To provide unimpeded material flow around runner, channels are used. Direct, short and highly polished runners reduce flow resistance to the minimum. Sharp turns are undesirable. A taper from a heavy cross-section near the sprue to a light section at the gate is general. Care must be taken to have large enough runners for the area served to prevent hardening of polystyrene in the runners cutting off pressure in remote cavities and causing shrinkage during the cooling period of the piece. Gating must be developed to meet the flow requirements of the individual piece.

The basic point of difference from die making for run-of-the-mine injection molded plastic parts is that the extreme accuracy required for precision cast pieces necessitates far more accurate dies and provision for simple corrections beyond the range of predictability.

More or less unpredictable shrinkage —and sometimes expansion—characteristics of polystyrene pattern sections make it risky to attempt a one-piece die for complicated patterns. Therefore, the die cavity is made up of as many inserts as possible. If it is necessary to correct dimensions a new insert may be set in without the cost of constructing a whole new die. Plating of dies has proved to be unsatisfactory in most instances, particularly on corners where a sharp accurate contour is necessary.

Nearly all production runs must be preceded by laboratory pilot production, sometimes lengthy, with a considerable amount of cut-and-try. This emphasizes the necessity of a well equipped laboratory and sufficient financial stability to absorb experimental costs.

Illinois Precise utilizes HPM horizontal injection molding machines for pattern production. The operating cycle of these machines, which are in common use in plastics molding, starts with the loading of pulverized polystyrene into a hopper which is agitated to move by gravity small quantities of the material into a feed cylinder as required. As the injection stroke starts, a hydraulically actuated plunger forces fresh material into the heating cylinder where it is melted, and at the same time displaces melted material, softened in the cylinder by heat and pressure, through an orifice into the tightly locked two-section mold cavity to form the piece. The pressure is held as long as necessary to cool or harden the material in the mold, the plunger then moving back to allow new raw material to drop into the feed cylinder. With the pressure relieved, the mold is unlocked and a movable section moves away from a fixed section. The sprue disconnects from the melted material, taking hardened material in the orifice and leaving soft material at the point at which it pulls away. Ejector pins push the molded piece completely free from the mold, after which the press operator places it in a receptacle for trimming, if necessary (fig. 3). Heating of the heating cylinder is by electrically heated oil with variable temperature control.

To maintain dimensional accuracy in the patterns die temperature during molding must be evenly held. Illinois Precision Casting Co. has experienced some difficulty on patterns furnished from outside sources from the dimensional variation of patterns injection molded during the early part of the day, with a cold die, and those made later during the work period after the die has heated. Operators

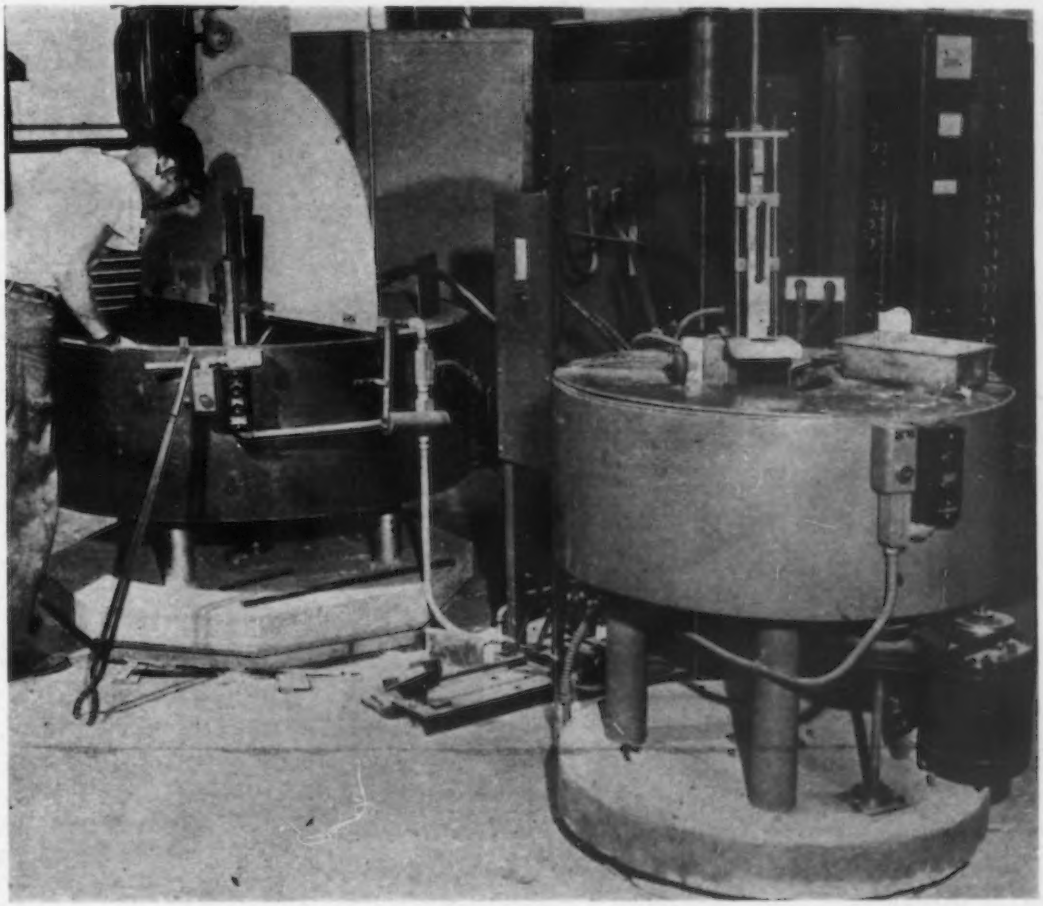
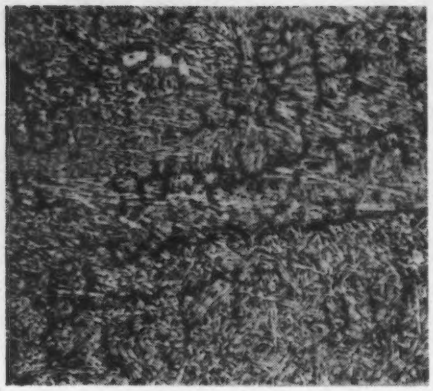


FIG. 7—Late model precision casting machines at Illinois Precise Casting Co. with generator equipment in background. One generator operates two machines.



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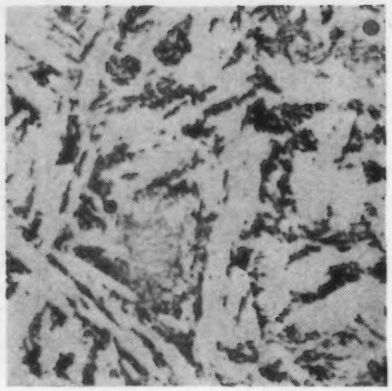

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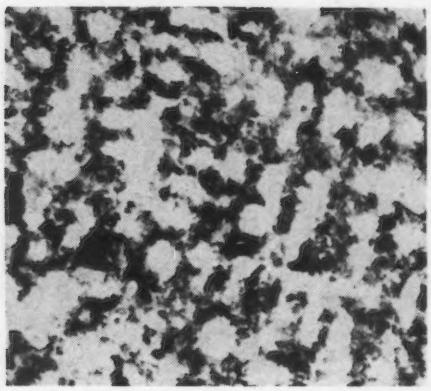

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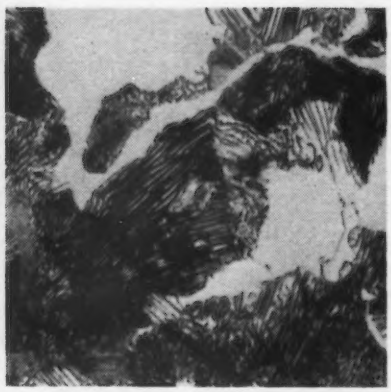

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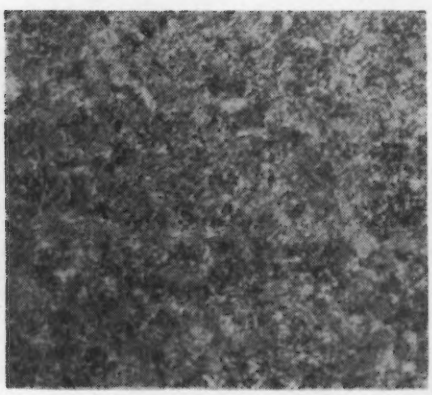

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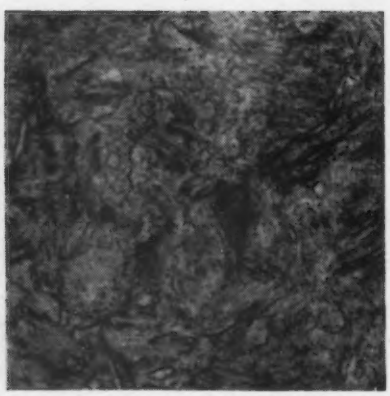
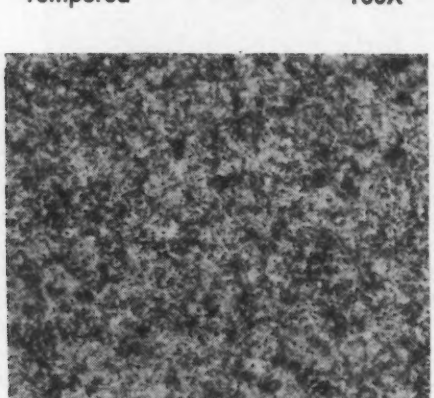
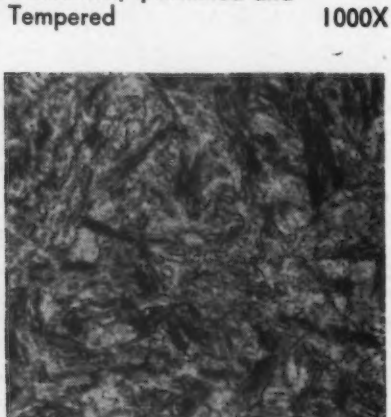


As Received, Quenched and Tempered 1000X



Annealed, Quenched and Tempered 100X



Annealed, Quenched and Tempered 1000X

FIG. 8—Microstructure of SAE 4140 Steel precision cast using polystyrene patterns. Structures are shown as-cast and after heat treatment.

not familiar with the accuracy necessary for precision casting often will suddenly cool a die after it has heated up causing a sharp variation in pattern dimension. Temperature and pressure under which polystyrene is injected into the die cavity also must be carefully watched.

Assembly of individual patterns into cluster casting formation by attachment to a shallow plug base or button corresponds to that used with wax patterns. Attachment of polystyrene patterns is achieved by moistening the tips with carbon tetrachloride, a polystyrene solvent, or "welding" them with bunsen burners. As with wax patterns, when the polystyrene sprue button attached, each assembled pattern is placed on a rubber base, flask placed over it, and investment poured (see fig. 4). After the investment material has solidified, but prior to curing, the rubber base is removed.

Little flash remains to be trimmed after injection molding of patterns. Flashing is reground for use with new material in feeding the injection molding machine.

Techniques of investment merge essentially with those of the lost wax process. Stainless steel flasks, fig. 5, are used to hold the investment.

As with most precision casting manufacture the binder used is in the realm of restricted information. One basic formula is used with various modifications. In general, any binder used for wax pattern investment will be satisfactory for polystyrene, although the reverse does not hold true. Polystyrene is said to be less chemically reactive than wax. (Polystyrene is dissolved or attacked by styrene, benzene, toluene, dioxane, ethyl acetate, ethyl benzene, ethyl chloride, carbon tetrachloride, turpentine, gasoline and certain patented solvents. It is unaffected by acetic acid, formic acid, butanol, octyl alcohol, 30 pct solution of sodium hydroxide, 30 pct solution of potassium hydroxide, ethylene diamine, salt water, bleaching solution, photographic chemicals and most fats, animal and vegetable oils.) From the standpoint of burning out patterns it is important that the binder be heat resistant so that sharp contours may be maintained. Again, the importance of laboratory runs before production is emphasized.

Smoothness of pattern surfaces has eliminated coating of patterns in the Illinois Precise Casting Co. production cycle.

Investment curing temperatures range from 90° F to 200° F and curing times from 24 hr to 3 days. Batch type gas-fired ovens are employed.

Polystyrene burns out at 750° F but

molds sometimes are brought down to 600° F before pouring of the metal. The upper limits of the temperature range are dependent on the size and shape of the pattern (length of cavity, diameter of cavity, and length of mold can) and the type of metal to be poured, but the upper limit is about 2000° F. Burn out time is dependent on hardness and grain size desired in the part, tolerances, surfaces and cores, and ranges from 1 to 3 hr. These factors control because pouring of the metal is done immediately after burning out the polystyrene pattern without cooling the molds to room temperature. Batch type gas-fired furnaces are also used for the burn out. Factors in metal pouring temperatures are, of course, the same as though wax patterns had been used and grain structures, tolerances, surface and type of metal controlled. An Ecco high frequency induction melting unit with automatic temperature control is employed for melting. Automatic horizontal centrifugal casting machines of the company's own design but of standard principle are employed (figs. 6 and 7).

No reclamation is made of plastic after it is melted out nor is mold material reclaimed.

Corrosion Performance of Blackplate in Cans

THE wartime and current scarcity of tin has made it necessary to seek methods of economizing in the use of tinplate in the canning industries. Wide investigations have been made of the corrosion of blackplate when substituted for tinplate in cans for fruit and vegetables, and a study of the problem is discussed by W. B. Adams and D. Dickenson in a paper recently presented before the Iron & Steel Institute, London.

It was learned at an early stage that the substitution of blackplate for tinplate over the entire can was impracticable because of difficulties associated with the soldering of the side seams of blackplate. Efforts were therefore confined to the use of lacquered blackplate in place of tinplate ends in cans. Even this partial substitution results in a saving of tinplate amounting to 35 pct to 40 pct for the small and medium sizes of cans commonly used for vegetables and fruits. The points noted in the study were the rate of formation of hydrogen in the cans, the rate of dissolution of iron and tin and the effect of the substitution on the color and flavor of the contents. The main conclusions reached were as follows:

(1) Cold-reduced plate is superior to hot-rolled plate on blackplate ends covered with a single roller-coating of lacquer. Phosphating does not reduce the rate of internal corrosion and may increase it if the lacquer adheres indifferently to the surface of the plate.

(2) Types of lacquer vary in the protection they afford. Lacquered blackplate ends, with a further dipped coating of lacquer, give results which are comparable with standard lacquered or plain tinplate ends.

(3) The rates of attack of the various fruits and vegetables on blackplate ends differ greatly and are highest for the acid fruits and beetroot.

(4) The substitution of blackplate for tinplate ends does not affect the color and flavor of vegetables if the lacquer protection is of average efficiency. The situation is much less satisfactory with fruits.

(5) The substitution of blackplate for the bodies of cans as well as the ends is impracticable for general use, but the effect on the storage properties is very similar to that observed in cans with tinplate bodies and blackplate ends.

In these tests the weight of the lacquer film on the phosphated plate was the same as that on the untreated blackplate. Better results were obtained when heavier films were used with phosphated plate.

One of the chief risks in substituting lacquered blackplate for tinplate is an increase in the rate of formation of hydrogen in the cans. The rate of corrosion of tinplate cans filled with vegetables is very slow compared with that of cans filled with fruits, and so it was necessary to use different experimental techniques for the two classes of products. With fruits the cans were merely held in store until the evolution of hydrogen overcame the partial vacuum initially present and then built up sufficient pressure for the cans to dome outwards and become "hydrogen swells." Results of comparative tests on fruits were generally ready after 6 to 12 months' storage.

The slower formation of hydrogen in canned vegetables made it necessary to measure very small reductions of vacuum in the sealed cans. This was done by recording the average change in depression of the centre of the ends below the level of the horizontal channel adjacent to the end seams. The measurement was made by means of a specially constructed spherometer on blocks of 8 to 12 cans of each lot and repeated at monthly intervals.

Metallic contamination of the contents is important from a health standpoint and from the tendency of tin or iron to cause discoloration in some vegetables. It is also a useful indication of the type of corrosion which has occurred.

These tests also show that the iron contents of vegetables packed in cans with blackplate ends protected by an efficient lacquer film are not appreciably different from those of cans with tinplate ends. The tin contents appear to be independent of the efficiency of lacquering of the blackplate ends.

The use of blackplate in place of tinplate ends did not affect the color of the vegetables appreciably, except in so far as the beetroots discolored in proportion to their iron content. Specks of iron sulphide were noted in some of the cans of peas, swedes, and carrots, particularly in those with single-lacquered ends. Apart from a metallic flavor in the beetroot with a high iron content, there was no apparent difference in flavor between the vegetables from blackplate and those from tinplate cans.

Surface Finishing Of Beryllium Copper

. . . Although regarded as a corrosion-resisting alloy under normal usage, beryllium copper components benefit when given electroplate finishes satisfactory for other copper-rich alloys. Details of numerous acid solutions for removing oxide scale are given with particulars of sulphuric acid treatment followed by acid dichromate solution. Cleaning specifically for electroplating is also discussed.

As beryllium copper is an alloy that can be precipitation-hardened by controlled thermal treatment, it is eminently suitable for the production of tiny components of intricate shape in which the final shaped article has to possess particular qualities of hardness or springiness. Under normal conditions of indoor usage and exposure, beryllium copper may be regarded as a corrosion resisting nonferrous alloy, at least equal to copper itself. But special consideration would have to be given in relation to any specially corroding atmosphere. Methods for cleaning and electroplate finishing of beryllium copper components included herein have been published in the British journal, *Metal Treatment*.

It is to be expected that unfinished beryllium copper will gradually stain and darken, finally becoming black under normal conditions in just the same way copper does. Likewise, it will become green with verdigris if contaminated with fatty acids from cutting oils, polishing compounds, handling, etc., or in acidic atmospheres of high humidity.

Electroplating finishes are applied to beryllium copper in exactly the same way as they are to copper, bronze and brass. For normal protection and retention of a neat lighted-colored appearance, nickel plating is usual, with nickel-chromium preferable for assuring complete resistance from attack over long periods. For electrical purposes, with special reference to retaining exceedingly low contact resistance, gold or silver is employed or a combination of silver and rhodium, particularly if resistance to wear is additionally necessary, as it may be on moving contacts. For easy soldering tin plating is used as a basis. These electroplate finishes necessitate particular attention to the cleaning of the surfaces of components, particularly after heat treatments, and then, providing the proper solutions have been employed for these, no difficulty should be encountered with electroplating from the normal electrolytes.

The removal of oil and grease from the surfaces at intermediate or final stages of production, as well as removal of swarf or chips presents no difficulties, and the usual processes as employed for other copper-rich metals such as phosphor bronze, aluminum bronze, brass, cupro-nickel, etc., are applicable. These include solvent methods, such as, trichlorethylene vapor degreasing, or those requiring the inexpensive inflammable solvents such as solvent naphtha, benzine, white spirit, and the like, these all being operated at normal shop temperature. They also include processes using aqueous alkaline solutions such as 5 to 10 pct caustic soda, 2.5 to 5 pct of a mixture of equal parts of soda ash and sodium metalsilicate. These cleaners are used hot, in the neigborhood of the boiling point, and preferably with the agitation provided by compressed air fed to a perforated coil in the base of the cleaner tank. Two water washes to remove the alkali from the parts completely must follow. The first of these can advantageously be cold water, and the second hot, from which drying off can easily be achieved.

In these degreasing processes, the solvent methods will remove liquid oils, but will not remove soap base greases or soap containing soluble oils. Liquid solvent must be used if chips and loose dirt are to be eliminated because vapor cleaning methods do not touch extraneous matter of this type. Again, in using cold solvent processes, the precaution should be taken of employing two baths of solvent in series, one in which to clean the work, and the other for a final rinse to remove the dirty solvent from the first immersion. The condensation of trichlorethylene vapor in a degreasing plant, of course, takes care of this point.

The aqueous alkali cleaning compounds can be designed to remove any loose contamination, such as mineral oils becoming emulsified, fatty oils saponified and soap base material emulsified and saponified. Loose dirt and swarf are pushed off the work by virtue of movement of the work, or agitation of the liquid. However, if heavy oily contamination has to be dealt with, then aqueous cleaners become very easily fouled, particularly if much mineral oil lubrication is concerned, and efficiency is lost because proper emulsification is not achieved and an oily layer separates on top of the cleaning solution. This tends to contaminate the work as it passes through this layer upon its withdrawal from the vat, and the resulting film upon the surface of the work is not properly removed, if at all, in the final water rinses. In fact, contamination of the latter usually occurs in such circumstances, despite a constant flow of clean water to the rinse tanks. The difficulty can be offset by using the best balance of caustic and mild alkalies to suit the type of contamination encountered, and to have two alkali tanks, in one of which the bulk of the contamination is re-

moved, and for the final cleaning.

Regarding the acid solutions for removing oxide scale and tarnish, necessary for giving a neat finish, and for preparing work prior to electroplating, a number of compositions have been suggested. A number of these have been tried to determine the most efficient, using beryllium copper heat treated in an ordinary fan tempering furnace at 590° to 610° F for hr to represent the average worst condition of components after precipitation hardening. The pickles used included sulphuric acid at various concentrations in water, dilute sulphuric acid containing oxidizing agents such as copper sulphate or potassium or sodium dichromate, and the usual sulphuric nitric acid mixtures that are employed for the bright dipping of copper, brass and phosphor-bronze. Also, successive treatments were examined, using first a soak in a straight sulphuric acid solution, followed by a shorter immersion period in the solution containing the oxidizing agent. The various acid solutions investigated and operating conditions are given below:

SOLUTION NO. 1—10 pct sulphuric acid solution. This was prepared from 1 volume of commercial concentrated sulphuric acid and 9 volumes of water. Employing this solution at a temperature of 190° to 212° F, upon immersion of the work, the black scale was quickly removed. At a lower temperature of 120° to 140° F, a longer immersion time was required, the maximum being 2 min. At ordinary shop temperatures of 68° to 77° F, a considerably longer period was entailed, 20 min being the maximum. In each case, the black was completely removed by immersion, that is, without mechanical aid as by rubbing or brushing, but the resultant appearance, although clean, was dull and patchy, with coppery stains.

SOLUTION NO. 2—25 pct sulphuric acid solution. This was prepared from 1 volume of commercial concentrated sulphuric acid and 3 volumes of water. Using this pickle at 190° to 212° F, complete removal of the oxide coating occurred immediately, giving a finish of appearance as for solution No. 1. Employed at lower temperatures, similar results to those recorded under No. 1 were obtained.

SOLUTION NO. 3—75 pct sulphuric acid solution. This was prepared from 3 volumes of commercial concentrated sulphuric acid and 1 volume of water. With immersion at a temperature of 190° to 212° F, removal of the black oxide scale was almost immediate. The resulting appearance of the work treated was similar to that recorded under solution No. 1, and treatments at lower temperatures gave longer pickling times of the same order as those for solution No. 2.

SOLUTION NO. 4 — sulphuric-nitric bright dipping mixtures. One of the procedures commonly employed for copper and brass was adopted, giving an immersion in a rich nitric acid mixture, then through water washing, followed by a treatment in a sulphuric rich solution, and finally water washing. These two acid solutions were prepared for commercial concentrated acids, the first from 3 volumes of nitric acid and 1 volume of sulphuric acid, and the second from 3 volumes of sulphuric acid and 1 volume of nitric acid. They were employed at ordinary temperatures of 68° to 72° F. Treatments of this type were unsuccessful, being without effect upon the oxide scale.

SOLUTION NO. 5—dilute sulphuric acid containing copper sulphate as oxidizing agent. The solution was prepared from 7 to 8 pct by volume of commercial concentrated sulphuric acid, 92 to 93 pct by volume of water, and 10 pct by weight of crystalline copper sulphate. Employed cold, results were not very satisfactory, the oxide scale not being much affected in 10 min.

SOLUTION NO. 6 — dilute sulphuric acid containing potassium dichromate as oxidizing aegnt. This was prepared from 1 volume of commercial concentrated sulphuric acid and 199 volumes of water, plus 10 pct by weight of potassium dichromate. The solution was used at normal shop temperatures of 68° to 77° F. It caused a loosening of the oxide scale in from 10 to 15 min, part of which could then be flushed off with a water jet. Complete cleaning could not be achieved even with successive treatments in this solution. Moreover, when dealing with a mass of small irregular shaped articles, it was found impossible to flush off loose scale without redepositing it upon other articles in the batch by mere mechanical entanglement.

SOLUTION NO. 7—more dilute sulphuric acid containing potassium dichromate as oxidizing agent. This solution was prepared from 1 volume of commercial concentrated sulphuric acid and 19 volumes of water, plus 3 pct by weight of potassium dichromate. Employed cold, this solution was not so effective as No. 6 but it is referred to again later as satisfactory in combination treatments.

A SELECTOR disk for Fairbanks-Morse scale. Disk is 0.045-in. gage beryllium copper with 525 teeth cut on a 10-in. circle.

SOLUTION NO. 8 — nitro-sulphuric acid containing chlorides. This solution was prepared from 2 volumes commercial concentrated sulphuric acid, 1 volume nitric acid and 1 volume water, and to the mixture 0.1 pct by weight of hydrochloric acid was added. The solution was used at 68° to 77° F. The mixture was not successful in removing black oxide from beryllium copper in immersion periods up to 10 min.

Acid Pickle and Dichromate

While the straight sulphuric acid treatments (Nos. 1, 2 and 3 above) proved satisfactory for giving a clean surface, free from black oxide, the appearance produced was not sufficiently neat for a final finish, nor sufficiently clean as a basis for electroplating. The following combinations were therefore studied.

(1) Acid copper sulphate followed by acid dichromate solution. The 10-min treatment in solution No. 5 was followed by immersion periods of up to 2 min in solution No. 6 without any evidence of improved results.

(2) Sulphuric acid followed by acid dichromate solution. (a) The specimens were given a 15-min immersion in solution No. 3 at ordinary temperatures, washed in water, and then treated for 1 min in the dichromate solution No. 6. The first solution removed the black oxide leaving a dull copper finish of somewhat dirty appearance, while the second cleaned this to a uniform coppery color of very good appearance. (b) A shorter period of about 10 min in the first solution, and 1 min in the second, or in the weaker dichromate solution No.

7, cleaned but did not yield so neat and attractive a finish. (c) Again reducing the time in the first solution by employing it hot at 190° to 212° F, a very quick dip sufficing because the black oxide is removed by dissolving immediately, then following by a 1 min immersion in the dichromate solution No. 6 or No. 7, gave satisfactory results, but not so good as with the extended dip in the cold sulphuric acid. Again, an extended immersion in the dichromate solution No. 7 for periods up to 3 min did not give further improvement without the detriment of etching up the rolling marks and other blemishes in the material. (d) The treatments in solution No. 2 at various temperatures, with corresponding immersion times, were followed by an immersion for 1 min in the dichromate solution No. 6 and satisfactory results, yielding a uniform finish, were obtained. The dichromate solution No. 7 was equally effective for the purpose. (e) The longer treatments in solution No. 1 at various temperatures were explored in conjunction with a 1 min dichromate dip in solution No. 6 or 7. Satisfactory results were obtained.

Shop Practice

In general, a good practice is to clean work from precipitation-hardening heat treatments by immersion in dilute sulphuric acid solution (1 volume acid, 9 volumes water) at ordinary shop temperatures, for a period of 20 to 30 min. The work is then rinsed in water and given a quick immersion in dilute dichromate solution (1 volume sulphuric acid, 19 volumes water, 3 pct by weight potassium dichromate) at ordinary shop temperature, for a period from a few seconds to 1 min as required. Thorough water washing and drying has to follow. When quicker treatments are specifically required, the acid solution can be used hot. The solutions can be maintained by chemical control or by the results obtained on work passed through. Positive control by chemical analysis is, however, to be preferred. The sulphuric solution can be maintained at 10 pct concentration by addition daily or weekly in accordance with the amount of work passed through them. At the same time, a stage is reached after a few periodic additions when it is more economic to scrap the solution.

In the dichromate solution, it has to be remembered that it is the dichromate that is the expensive ingredient, and this is the active agent in providing the uniform clean. Dust and dirt decompose it as well as metal.

ADJUSTABLE pitch propeller hub cones.

It is therefore advocated that this solution should be used in minimum volume in the smallest convenient container. As far as possible, fresh solutions should be made just before they are required, and they should be kept covered when not in use. Additions can be made as required by chemical analysis, but additions beyond the practical economic point should be avoided.

Work that has been annealed or solution-treated is more difficult to deal with because it has been subjected to a temperature of 1490° F for 20 min or more. Usually it is found that the oxide scale is heavier and more adherent, and in consequence the simple cold treatments just recommended do not fully meet the case. The hot acid solutions then have to be employed, following of course with the cold dichromate immersion.

The attention that obviously has to be afforded to this cleaning stresses the fact that heat treatments should be controlled precisely in order to minimise the degree of oxidation. When neutral or reducing atmosphere furnaces are available for the heat treatment, they are a distinct advantage from this point of view.

RETRACTABLE landing gear ring, one third actual size.

The straight sulphuric acid solutions only remove the oxide coating and do not adversely affect the dimensions of the components. Hence, immersion time is of no consequence from this angle. The dichromate solutions, on the contrary, dissolve the metal, and therefore can upset close dimensional tolerances. For this reason, immersion times must be minimised, and it is advantageous to agitate the work, for example, shaking it in baskets in the solution. Minimised time also means lowest consumption of potassium dichromate, and therefore, longest life. No adverse influence on dimensions should occur in an immersion of 1 min.

In these acid cleaning solutions, the loss in thickness or of weight for beryllium copper is of similar order to that for copper. The straight sulphuric acid solution does not cause appreciable loss even in the very long periods of the tests. The same can be said for hot solutions. On the other hand, appreciable attack occurs in the solution containing potassium dichromate. Nevertheless, if treatment in this solution will not exceed 1 min the thickness loss will only be of the order of 0.00001 in., which is not only negligible in practice, but probably less than the loss in thickness due to the formation of oxide in the heat treatment process, a loss which has to be incurred in any case because this oxide must be removed.

Cleaning for Electroplating

In cleaning specifically for electroplating processes, all work should have been degreased and subjected to the double acid cleaning for removal of heat-treatment oxidation. Work not passing through heat treatment need not be given the acid cleanses, but it is generally more convenient to subject all work to the same operations. It certainly safeguards against any included oxide.

The best acid treatments to ensure adherent platings have been found to be the usual bright dips employed for copper, phosphor bronze and brass, e. g., the composition and treatment already detailed under solution No. 4. It has already been shown that these solutions are ineffective in the presence of heat-treatment scale, and the latter must be completely removed, and the finish brought into a uniform condition by means of the dichromate solution, before the bright dip treatment is applied. Otherwise, irregular attack with much local pitting occurs. Following the prescribed procedure, however, a good bright clean finish is obtained. The time of

immersion in each of the nitro-sulphuric acid solutions need only be a few seconds and the loss of dimensions is negligible. Precautions must be taken in making acid additions to the solutions to maintain acid strength, that the original ratio of nitric to sulphuric acid is not exceeded, viz., excess of nitric acid must be avoided as this may cause excessive attack. Thorough water washing must follow to avoid carrying these acids over to the plating solutions.

If work is going into alkaline plating electrolytes, it can advantageously be rinsed in dilute sodium cyanide solution (about 5 pct strength at ordinary temperatures), followed, of course, by water rinsing. This cyanide rinse may be advantageous in any case for removal of light oxide stains, but there may be objections to passing work from an alkaline cyanide rinse into an acid electrolyte. In this case, a cold dilute sulphuric acid rinse (5 pct to 10 pct strength) is advocated between the cyanide treatment and the plating operation. In this way, any minute film of chemicals retained superficially on the work, or in its pores, or solution held in recesses, is of the same nature as the electrolyte, and does little or no harm, whereas when it is different with respect to acidity or alkalinity, it can be objectionable and invariably causes faulty adhesion.

Electroplating directly from the sulphuric acid and sulphuric acid-potassium dichromate treatments (that is, omitting the nitro-sulphuric acid process) was found to be unsatisfactory in every case. In every such case adhesion was indifferent and showed poor when judged by bend tests such as gradually bending around a radius equal to four times the thickness of the material. This applied whether or not the cyanide process was included. On the other hand, adhesion was entirely satisfactory in all cases when the nitro-sulphuric acid operation was included. With work not passing through heat-treatment operations, excellent results were obtained without using the sulphuric acid and sulphuric acid dichromate mixture prior to the nitro-sulphuric acid process.

In connection with these acid cleanses prior to electroplating, investigation covered sheet thicknesses upwards from 0.008 in., tempers from the annealed to the hard state, and embraced work in the condition with or without heat treatment. The electrolytes used for plating were orthodox ones selected to represent the commercial range encountered in practice. They included the following: (1) an ordinary nickel sulphate plating solution (that is, an electrolyte slightly acid with sulphuric acid); (2) a rapid gold-plating solution, that is, an electrolyte alkaline with free cyanide; (3) a stannate tin-plating solution, alkaline with free caustic soda; (4) a sulphate tin-plating solution, slightly acidic with free sulphuric acid; (5) a combination of (1) followed by (3), then heat treated 290° F in a controlled atmosphere.

Broadly speaking it is evident that any established electrolyte, operated under sound conditions, can be used for beryllium copper components.

Spectroscopic Control of Tropenas Converter

OBSERVATIONS of a tropenas converter flame through a direct vision spectroscope indicate that there is a very definite relationship between the bands in the flame spectrum and the composition of the metal in the bath, S. T. Jazwinski reports in a paper to the British Iron & Steel Institute.

At the beginning of the blow a very faint continuous spectrum is visible. At this moment the flame is dull red mingled with dense brown fume, and sparks are ejected in a diverging stream with a number of clusters of scintillating sparks.

The continuous spectrum becomes gradually brighter and stronger until the flame appears more bright with less clusters of sparks and brown fumes. Then ejects are thrown out and a fine, weak, yellow band appears in the spectrum. At times the ejects continue for several minutes and become very violent. The yellow band is then very clear and steady.

After the ejects have ceased the flame becomes longer and brighter with only a few sparks. At this moment only a yellow band is visible. The flame then drops and is duller, but it again increases in intensity and brightness. The spectrum now shows the appearance of a green band. At first it is so faint that its appearance is spasmodic. Then the flame becomes very bright, irregular-shaped and unsteady with few sparks; this is the well-known carbon flame. Two other green bands, one on each side of the first, and two red bands are then visible. If the flame is exceptionally brilliant, a blue band becomes visible. All these bands then appear very clear and strong, but after an interval of ½ to 1 min the red, green and blue bands disappear and leave only the yellow band. At the same time the flame shortens and the wind is subsequently shut off.

The disappearance of the red, green and yellow bands is believed to be an indication that the blow is finished and the carbon near 0.1 pct. If the wind is not shut off when the bands disappear, the heat becomes overblown with consequent low carbon content, higher losses of metal due to oxidation and excessive wear on the linings.

Before it can be definitely stated, however, that the disappearance of the red and yellow bands really shows the true end of the blow other investigations must be carried out simultaneously with observations made with the aid of the spectroscope. Only by determining the temperature of the blown metal, the quantity and composition of the slag (before additions) and the metal losses, as well as making the spectroscopic observations, will all the necessary data be obtained.

In these preliminary investigations only the relative positions of these bands were determined; no attempt was made to measure the wavelengths nor to prove that the yellow band indicated sodium or the other bands manganese.

The real value of spectroscopic observations lies in the possibility of controlling the converter blow without introducing the human factor, and the consequent elimination of over- and under-blown heats.

Welding Galvanized Steel

° ° °

FOR highest tensile strength in galvanized steel welds, a "short sharp heat" with mechanical pressure on as soon as the electrode comes down should characterize spot-welding machine settings, according to E. F. Pellowe and F. F. Pollak writing for the British publication, *Sheet Metal Industries*.

The usual spot-welding machine, with say a nominal rating of 40 kva, will quite easily weld a piece of 10-gage mild steel plate to a structural section of ⅛ in. thickness (fig. 1). The four variables of current, mechanical pressure, time and electrode size can be permuted until the best weld is obtained. The "best" weld will have the highest tensile strength, but a fairly accurate if somewhat crude test is to knock off the plate from the section by the use of a cold chisel. If the welded area pulls out of the plate it is an indication of a sound weld. The main question to answer is how the galvanized coating affects the weld and the machine setting. To do this, the thermal aspect must be examined.

To produce a good weld, a certain amount of heat must be evolved in the cylinder between the electrode tips, and this is given by:

(1) Area of electrode × total thickness × mean specific gravity × welding temperature × mean specific heat.

A typical galvanized coating is about 0.003 to 0.004 in. thick, but is somewhat uneven. The coating consists essentially of zinc on the outside—a metal of melting point 790°F, but easily volatilized (the situation thus differing from tim and lead coatings) and having a great affinity for the copper electrode on the one hand, and for the iron matrix of sheet or section on the other.

Below the outside layer of zinc there are iron-zinc alloys, a gradual increase in the iron-to-zinc ratio occurring as the matrix is approached. At least three alloys of various compositions as well as solid solutions are supposed to exist, but the presence of $FeZn_3$ with a melting point of about 1440°F appears to be fairly well established.

The heat required for a galvanized sheet and section depends upon:

(1) Electrode area, which is constant for a given thickness of sheet.

(2) Thickness of sheets, which is increased by four galvanized coatings, i. e., 0.012 to 0.016 in., or approximately 8 pct higher as compared with fig. 1.

(3) Specific gravity, which on the average is practically the same.

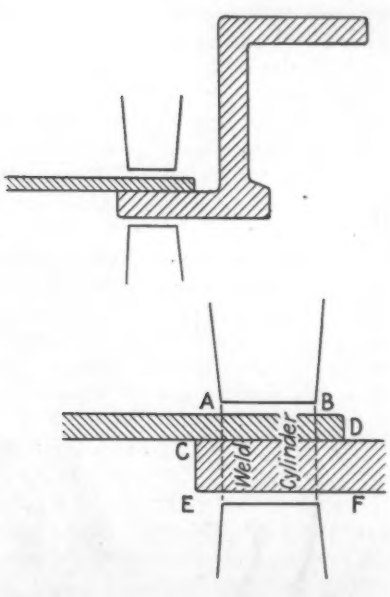
(4) Welding temperature, which must be higher.

(5) Specific heat, which on the average is practically the same.

A much shorter welding time has been found to be necessary for these coatings, and as this demands a higher welding temperature the actual metallurgy of such a weld (fig. 2) may now be considered.

The three interfaces, AB, CD, EF, are all zones of electrical resistance, and of these CD, or zinc to zinc, is the main one.

As far as the electrode to zinc interfaces are concerned a short time is advantageous as (1) the longer the copper electrodes are in contact with zinc the greater the attack upon them with subsequent brass formation; (2) with a longer time the quantity of noxious zinc oxide fumes given off is greater, and consequently the health risk of the operator may be involved; and (3) the outside zinc surface would be burned and deeply scarred and consequently extra work would be involved in cleaning up. Moreover, if pitting is deep the cor-



LEFT

FIG. 1 — Diagrammatic representation of welding mild steel plate to a structural section.

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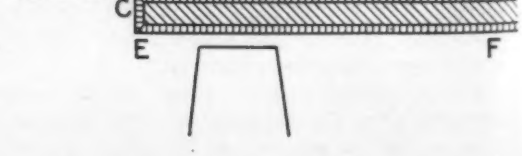


RIGHT

FIG. 2—Distinguishing interfaces when welding two galvanized plates. Each interface is a zone of electrical resistance and presents its own welding problem.

rosion resistance may be impaired by the removal of zinc.

At the main interface, CD, the double zinc layer presents a problem. Supposing the pressure to be brought on before or simultaneously with the current then the zinc to zinc interface heats up fastest because the comparative uneveness and oxide skin present the greatest resistance to the current. The zinc quickly melts and is displaced sideways by the pressure, leaving a steel to steel contact. This then welds up in the normal way.

The policy of a short sharp heat is fully justified since the squeezed-out zinc covers the weld completely and gives extra corrosion resistance. Little is lost by volatilizing and not much time is allowed for zinc-iron alloy formation to occur or to diffuse inside the weld. If it did, a brittle weld would be obtained.

Mechanical pressure must be on as soon as the electrode comes down, and the machine should be capable of producing something up to 2000 lb absolute. Thus pressures in the range of 20 to 40 psi reading on the gage on a piston head of, say, 8 in. diam are common. This range is considerably higher than for steel, and is needed to overcome zinc surface roughness. Zinc surfaces, when welded at too high a current, show a tendency to crack, and minor explosions may occur, presumably due to arcing across an air space. In this case metallic zinc has to volatilize to render the gap conducting. When using the right current, however, this does not occur, and the welding process is carried out smoothly.

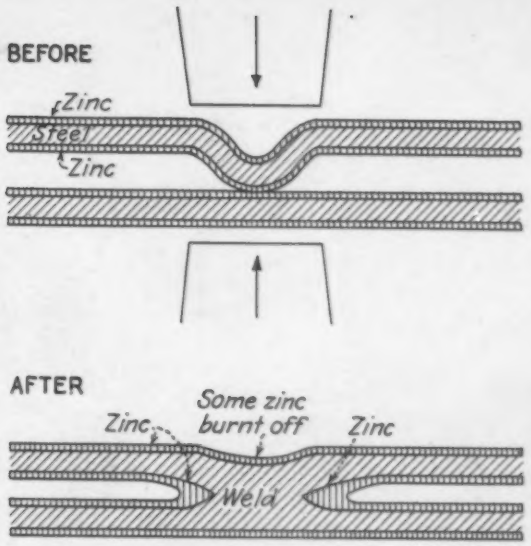


FIG. 3—Representation of projection welding of galvanized steel. Projections should be made before welding, to give a continuous surface.

Timing must be adaptable, and very short periods are the rule rather than the exception. A robust design based on thyratron or ignitron control is needed.

Under the above conditions of temperature, pressure and time 16-gage strip can be welded in production to ⅛ in. plate, both being galvanized.

The electrodes will meet with a definite attack from the zinc coating, and this will necessitate somewhat more frequent cleaning. When the electrodes are worked in a dirty state, with a coating of zinc oxide and brass, then resistance at the AB interface gets higher and the situation is aggravated; the weld suffers. It is recommended that a large stock of electrodes be kept cleaned in the machine shop and issued to the machine.

Under no circumstances should a file be used to clean the electrodes in situ. A cleaning device can be used which keeps the electrode tip to the correct area, or the electrode can be turned up in a lathe and the tip cleaned with emery paper.

Water-cooled electrodes should have the correct tap size, this depending upon the thickness of work.

It is sometimes the practice to etch galvanized work preparatory to painting, with phosphate or phosphoric acid preparations. These leave an insulating film of phosphate on the work, and this would cause considerable difficulty in welding.

With projection welding the projections should be made before galvanizing, to give a continuous surface on the projection. If the dimple is made after galvanizing, then the coating may fracture and a standard weld cannot be obtained. (See fig. 3.)

Behavior of Charge Material in the Cupola

AN investigation of the physical conditions existing in a cupola conducted by N. E. Rambush and G. B. Taylor and reported to the Institute of British Foundrymen was begun because of irregularities in the carbon content of a melt resulting from changes in the pig iron charge.

The blast was shut off and water poured on top of the burden through the charging door without danger to the operators. The charge was rendered inert by water-cooling in less than 40 min. A few hours later the charge was removed piecemeal from the top downwards. From the appearance and position of the coke and of previously drilled pieces of pig iron and steel, a picture of the cupola process was built up, with special reference to the absorption of carbon.

It was found that however carefully the charge materials are placed in a cupola in relation to one another, their original relative position is not maintained during the descent of the charge. The dominant factors governing the manner of descent are the shape and size of the metallic pieces.

The coke, although evenly sized to start with, becomes progressively smaller from top to bottom of the shaft. Reduction in coke size in the bed proper is not uniform across a horizontal plane, the coke in the center being reduced the most, while that against the walls is almost unaffected. As the day's heat proceeds, the main factor altering the line of flow of materials through the cupola is the extent of the slag ledge or bridge formed above the tuyere.

The carbon content of the steel test bars (marked by drilling) increases very slightly in their downward travel when solid, but at the start of melting, the carbon absorption becomes much more rapid. The melting steel absorbs carbon chiefly at the surface, the center remaining practically unaltered. The highest carbon content found in a solidified drop of metal was 1.2 pct, with some of the carbon picked up by the steel remaining graphitic in nature. The steel in the charge picks up sulfur rapidly on its surface shortly after its introduction into the cupola, but some of this sulfur seems to be given off again as the steel descends the cupola.

• • The furnace in operation at Pembroke, Florida, 1931.

Moving the Pembroke Blast

o o o

THE moving of blast furnaces from one place to another has been going on from time to time almost ever since sheet iron furnace shells replaced the solid stone stacks of the anthracite blast furnaces in the eighteen seventies. Whole blast furnace plants were moved from one state to another for certain metallurgical or economical reasons, such as when a blast furnace built for using raw bituminous coal was moved to the Pittsburgh region to get the benefits of low cost beehive coke. In some cases a blast furnace plant has been moved across oceans and rebuilt on another continent as in the case of the Battelle furnace plant that was erroneously and expensively built at Battelle, Alabama, in 1904 and after a short run was idle till World War I when it was dismantled and shipped to India where it became very productive and profitable.

During World War II several blast furnaces were moved from one state to another, and at least one was moved down to Mexico. In most cases the reasons for removal were, especially during the two world wars, the urgent need for pig iron and the almost impossibility of getting the steel and machinery for building new plants.

The removal of the Pembroke blast furnace from Pembroke, Fla., to Rusk, Cherokee County, Tex., was unique in many particulars and unlike any other furnace migration. As it stands today erected by the F. H. McGraw & Co., Hartford, on land deeded by the citizens of Rusk to the Defense Plant Corp., it is one of the best constructed and best equipped charcoal iron blast furnaces. The blast furnace, hot blast stoves, draft stack, double skip hoist, downcomer and dustcatcher, and stock-house bins are all in the same position as they were in Florida, and on the same level. Comparing the photographs in Florida with those in Texas, it can readily be seen that it is the same plant, and it is necessary to go inside the cast house to see what alterations have taken place.

This furnace at its new location at Rusk has never operated. Attempts are underway to get it into operation.—Ed.

In the first place, the Pembroke blast furnace was not an iron blast furnace. It made only slag and gas and it had neither iron notch or pig bed. In the second place, it did not use charcoal but coke for fuel and it was equipped for blast pressures up to 25 lb per sq in. Every seam and every rivet was calked to prevent leakage of gas and blast. Now, the plant is geared to very low blast pressures and small volumes of low-temperature blast-furnace gas. The present furnace has a cast house, hot-metal ladle and sand pig bed instead of condensers and vats for the recovery of elemental phosphorus, for which it was originally used. All these facts are being mentioned to explain the difficulties encountered in dismantling the furnace and the three hot blast stoves.

The whole plant, electrically operated, was originally built by a phosphate company utilizing a Ger-

• • Completed construction of the blast furnace at Rusk, Texas, 1945.

Furnace From Florida to Texas

By RALPH H. SWEETSER
Blast Furnace Consultant, New York

o o o

man process for making elemental phosphorus from the Florida phosphate rock by smelting ordinary blast furnace coke and sintered calcium phosphate in a coke blast furnace. After three attempts, with a total of 101 days of operation, the plan was given up, the chemical plant dismantled, and the tight little furnace left standing idle for 10 years. The ownership subsequently passed to the Pembroke Chemical Corp., an English controlled chemical company. It was not even on the list of idle blast furnaces because it was not for iron, and was practically unknown until McCrossin & Co., Engineers, New York, obtained an option on it, and proposed to use it for the project at Rusk, Tex., a project that had been contemplated for many years. Working on the staff of McCrossin & Co., Dr. Donald F. Othmer of the Brooklyn Polytechnic Institute and the writer worked out the plan for altering the furnace to make charcoal pig iron at Rusk. The project was presented to the War Production Board by the McCrossin Engineering Co. who in turn awarded the construction contract to F. H. McGraw & Co. This work included the dismantling, marking, loading on cars and removal of the Pembroke blast furnace and its subsequent re-erection at Rusk. Then the fireworks started, because the entire brick lining of the furnace downcomer and hot blast stoves had been impregnated with phosphorus; much had been fused from the intense temperatures, and jack-hammers had to be used with danger from the sparks and fire.

Because of the heavy calking of all seams and rivets it was first planned to cut the steel plates with torces and ship in as large sections as the railroad would take. This plan was given up and the plant was taken apart in the largest shipable sections by knocking out the rivets. This job was so skillfully done that there was not a single ragged rivet hole on the job.

To change from a furnace making slag and a hot coke gas carrying phosphorus to a charcoal iron blast furnace it was only necessary to change the lines of the brickwork and put in a new and deeper hearth jacket. Of course, it was also necessary to add an iron notch, casting trough, dam and skimmer, and to extend the cast house so as to make sand-cast pig iron. The roof of the cast house of the dismantled charcoal blast furnace of the Delta Chemical & Iron Co., Wells, Mich. was moved to Rusk and connected to the short furnace shed of the Pembroke furnace in such a way that it looks as though it had always been a part of the furnace.

It is possible that the good original construction of the Dovel-designed Pembroke blast furnace and its careful preservation during 10 years of idleness have contributed much to the present excellent appearance and condition of the Rusk blast furnace, but the remarkable part of the whole job is the perfect way in which each match-marked piece was put in place at Rusk to give one of the best built and smoothest jobs of all the blast furnaces that have been dismantled, moved and re-erected.

Porosity in Navy G and M Metals

FROM the research department of R. Lavin & Sons, Inc., plus observations in the plants of this and other nonferrous foundries come the following data on known causes of porosity. This article, while discussing specifically porosity due to foundry practice in a cylindrical casting, has much wider applications since the porosity encountered here is the same as in other types where such defects are often hidden by an unmachined surface.

By WILLIAM B. GEORGE

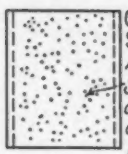
Metallurgist and Engineer, R. Lavin & Sons, Inc., Chicago

PERMEABILITY OF MOLDING SAND IS TOO LOW

Holes ranging in color: Black green, brown, red, orange and yellow

Often affects pressure tightness

WATER vapor holes caused by the boiling of metal in low-permeable sand. Slag deposits are found among the holes associated with green skin films embedded in the castings. Permeability of the molding sand used in this casting was probably about 12 whereas a permeability of 40 would have been more satisfactory for this size casting.

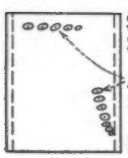


OVERHEATING AND SOAKING METAL

A porous, evenly distributed sponge. Sprue may have shrunk but a small copper tin button is usually forced out on top in the shrink

Casting will leak

THIS porous condition is due to overheating the metal and creating large grain size and is usually associated with a slight gas condition between grains. To prevent this metal should not be heated more than 100°F above the temperature needed for casting and should not be allowed to soak in the furnace.

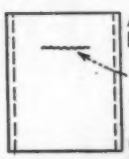


STRENGTH OF MOLDING SAND IS TOO LOW

Holes from golden red to golden yellow

Does not affect pressure

WATER vapor holes from loose sand grains washed in from the sprue and the gate. High temperature drove off the combined water of the sand grains and clay, and the residue was sintered into a tiny cinder within the hole. Original diameter of the water expanded hundreds of times its original dimensions and this sintered residue is usually about 0.005 in. diam and may be seen with a 10-power glass. The green strength was probably about 5 lb, whereas 8 lb would have given better results.

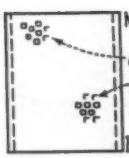


A POROUS HORIZONTAL LINE WHICH LEAKS

Fine crack shows dark crystal fracture

Casting generally leaks

THE porous horizontal line which leaks illustrated here is caused by removing the cope too quickly and allowing the casting to remain in the drag. Uneven contraction, caused by shaking out while too hot, will crack these alloys. Castings should be permitted to cool within the molds. If the casting is taken out while too hot, the exposed surface turns black after removal from the mold.

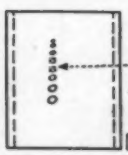


MOLDING SAND IS TOO WET

Grains appear like crystal sugar. Fracture shows from gray to golden yellow

In most cases affects pressure tightness

THIS granulated structure, that can be seen under a 10-power glass, was caused by water vapor from steam in wet sand or wet blacking. To prevent such defects the mold should be skin dried when faced or blackened.

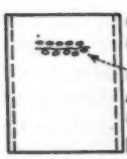


DIRTY LADLES

Large to small clean yellow holes in a straight course

Does not affect pressure tightness

GAS holes that look like flying geese are often caused by a small piece of oxidized metal entrapped in slag that has entered with the stream while pouring. This will occur when the metal covers an old slag line lower in the ladle lining. The oxidized metal is reduced back and the gas, probably P_2O_5, is released within the casting. Neutral slag does not throw off gas. A piece of oxidized metal can be minute in size and still produce a good sized string of holes. Clean ladles should be used and phosphorus put in the bottom, allowing enough time for reaction to have taken place and subsided.

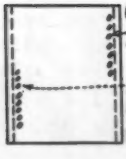


GAS HOLES FROM A CORE BUCKLE

Orange to golden yellow holes in straight line. Associated with embedded core sand

Does not affect pressure tightness

OVERBAKED and underbaked core halves cannot be pasted together since expansion being far greater in the overbaked core will cause that side to buckle, throwing core sand and gas into the casting. Occasionally, the core halves will rip loose on the pasted seam with the same disastrous results. Halves on large cores should be of the same mixture and baked in the oven at the same time.



GAS HOLES AROUND CORES

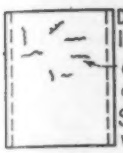
Holes which range from dark red to golden yellow in some castings. In other castings they may be black, green, orange and yellow

Does not affect pressure tightness

IT is assumed that gas holes around cores are caused by oxidized metal. The oxygen in the metal reduces the core binder to CO and CO_2. Often there are other reactions between the metal and the core. All conditions must be known, however, to understand fully causes of this type of defect. Oxidized metal should be reduced with phosphorus before being poured over cores.

and Red Brasses ▲ ▲ ▲

SINCE the demand and use for Navy G and M metals and all red brasses is so great, it is of prime importance that foundrymen be acquainted with causes for porosity in these metals. The porosities encountered in these alloys are so closely related that they can be discussed jointly. For simplicity, discussion is limited to a cylindrical casting approximately 16 in. ID x 18 in. OD x 24 in. long, finished and capable of withstanding 250 lb of air pressure. The finished casting must be free of all imperfections and subject to test pieces cut from any section to check physical properties.

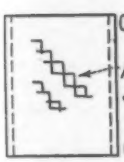


DROSS INCLUSIONS EMBEDDED IN SIDE WALLS

Oxide fins. Red and green in color on fracture

Seldom affects pressure tightness. Only when completely through the section

DROSS inclusions embedded in side walls generally result when excessive strings of oxidized metal form on the lip of the ladle. Metal should contain enough phosphorus to dissolve these films, otherwise they will flow into the casting and will not redissolve. Usually 0.01 phosphorus will counteract this trouble. It is usually added as 1½ oz of 15 pct phosphor copper shot.



COOLING CASTING TOO RAPIDLY

Fine dark checkered lines which show up after machining

Casting generally leaks

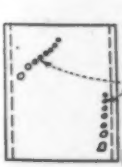
A CHECKERED appearance found in castings after machining are caused by placing casting in sand blast while hot or trying to cool outside surface by air or water spray. Castings should be cooled within molds naturally.

METAL WAS POURED TOO HOT

Orange, yellow, or golden red cleavage in wall

Casting will leak

A CLEAVAGE crack in the side wall is due to high temperature pouring which destroys the advantage of directional solidification. The crack illustrated here indicates the metal was poured at least 200°F above the proper temperature.



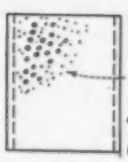
USING THE SWAB TOO FREELY

Clean holes in straight line golden red to yellow in color

Does not affect pressure tightness

SMALL gas holes often come from a slag formed by metal boiling in the sprue or runner. The releasing of the combined water is not completed until the slag enters the casting. These holes can be traced by a fracture to the inclusion. Neutral slag does not throw off gas. The runner of the casting usually shows the fused white color of sand on the skin. Metal will dissolve the linings of improperly glazed ladles and show similar results but as a rule with more slag and less gas holes.

HYDROGEN gas is entrapped in the metal from improper furnace practice. Metal absorbs gas rapidly under high temperatures and reducing atmospheres. This gas is liberated in inverse proportion to its cooling rate. In oil and gas fired furnaces, satisfactory results will be obtained when the furnace discharge contains 0.5 oxygen. The sprue and risers do not shrink when metal is gassed. Usually, they bulge on top.



IMPROPER FURNACE COMBUSTION

A porous casting consisting of clean brown, red, orange and golden yellow holes

Casting will leak

STEAM holes resulting from metal eating into sand appear within the casting opposite a patch where the mold was soft. The metal embeds some of the sand and shuts off its vent to the outer mold, driving water vapor back into the casting.

SOFT MOLD RAMMING

Steam holes golden yellow in color, just over scab in mold

Does not affect pressure tightness

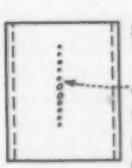
GAS holes, probably CO or CO_2 gas, result from metal eating into a soft spot in the core. The metal embeds some of the sand completely and shuts off its vent into the core, driving back combustible gases into the casting.

IMPROPER CORE MAKING

Gas holes golden yellow in color. Opposite scab in core

Does not affect pressure tightness

MUD in the core seams produces steam holes. To prevent these holes core seams should be filled with a fine molding sand and blackened over. If a piece has broken out of the core, a section of the core should be pasted in to fill the hole. It should never be filled with mud or black lead.

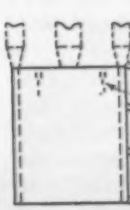


STEAM HOLES FROM PASTE IN CORES

Small to large clean golden yellow holes

Does not effect pressure tightness

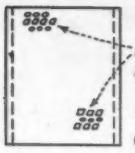
RISERS that are placed too far apart result in internal shrinkage.



PROPER GATE BUT RISER ILL-PROPORTIONED

Coarse crystalline structure, brown, red, orange and golden yellow fracture

Castings will leak

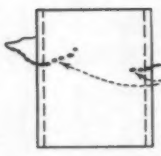


UNDRIED LADLES

Fine orange to yellow colored holes associated with gray to yellow crystalline structure on fracture

Casting generally leaks

WATER vapor from pouring metal into a green ladle gives a spongy casting as shown here. A ladle should be lined with a mixture of silica sand and fire clay in order to dry it properly. Clay alone will not give up its water under regular methods of drying. Where a crucible is used as a ladle, it should be preheated to a bright red as some of the binding material may not be sintered and contain moisture.

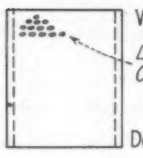


HOLES FROM PARTING AND MOLD CRACKS

Even size holes clean and golden yellow in color

Does not affect pressure tightness

DIRECTIONAL holes are driven back into a casting by a fin or crack in a mold. In both green and dry sand molds the fin shuts off the vent, and the gas generated in the corner pockets is forced into the casting.

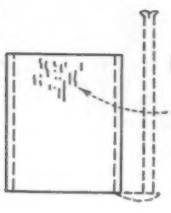


WATCH YOUR CHARCOAL

Large and small clean holes. Orange to yellow

Does not affect pressure tightness

METAL is gassed from placing charcoal in the bottom of a ladle and pouring metal on top of it. Charcoal contains water and unless dried just before using, this moisture will combine with the metal.



IMPROPER GATE

Coarse crystalline structure, brown, red, orange and golden yellow fracture

Castings will leak

IMPROPER gating caused this internal shrinkage.

POOR CORE MIXTURES

Porous grain structure under spots where metal has drained into core

Casting will often leak

WHEREVER metal has drained into the core, porous spots can be found in the casting. In this case, the core lacked high heat resistance, and segregated alloy of an analysis different from the casting itself has drained out of the casting, leaving a leaking structure. In analyzing fins that eat into the cores of an 88 Cu, 8 Sn, 4 Zn alloy, the most frequent chemical content found is 72 Cu, 16 Sn and 8 Zn. The metal that ate into the core had a lower melting temperature than that of the casting and drained out through the grain boundaries, leaving a porous structure. Risers will not always take care of this condition. Metal will not eat into cores any more than molds when they have the same hot strength. Four methods used to overcome this infiltration are: (1) The use of more molding sand in the core mixture; (2) addition of clay; (3) addition of silica flour, or (4) the addition of ferric oxides. Ferric oxide does not lower the permeability of the core appreciably and is recommended where clay or fines are not permissible.

Segregation in a Rimming-Steel Ingot

THE results obtained some 13 years ago on a rimming-steel tinbar ingot made at the duplex plant of the Tata Iron & Steel Co., Ltd., Jamshedpur, India, are contained in a paper entitled "Analytical Survey of a Rimming-Steel Ingot," by J. S. Vatchagandhy and G. P. Contractor, and presented to the British Iron & Steel Institute.

A 5½-ton ingot of rimming steel containing 0.11 pct of carbon and 0.45 pct of manganese was sectioned along the vertical axis for analytical survey and sulfur-printing. The results of chemical analysis made with reference to the distribution of carbon, manganese, sulfur and phosphorus, the authors state, did not appear to indicate any significant departure from the known trend of variations of the segregating elements from the outside to the center of the ingot and from the bottom to the top.

The results of sulfur and phosphorus determinations showed that these elements were some 60 to 80 pct of the ladle analysis figures in the outer portion of the rim, and fell to 45 to 60 pct of the ladle figure in the inner portion. At the bottom and the middle of the ingot, the degree of segregation of these elements was practically of the same order. In the bottom cross-section these elements at the junction zone were 7 to 8 pct over the ladle figures, whereas in the middle cross-section this variation was about 36 to 41 pct. At 68 pct of the ingot height there was a marked difference in the degree of segregation; whereas phosphorus was 25 pct in excess of the ladle figure, the sulfur was as high as 56 pct. The manganese content of the outer surface of the rim was 11 to 15 pct higher than the ladle figure. Although it decreased through the rimmed zone, it did not fall below the ladle analysis, the variation being approximately 1 to 7 pct above the ladle figure. The degree of segregation at the junction and throughout the core varied from 15 to 17 pct, and 11 to 15 pct, respectively, above the ladle determination. This meant that there was little difference in the manganese content from the outside to the core.

The theoretical carbon percentage at the balanced composition for the ladle manganese figure of 0.45 pct, the authors point out, was 0.0714, 0.0875 and 0.101 pct at 1, 1.5 and 2 atmospheres respectively. Thus, 0.11 pct of ladle carbon was above the balanced composition even with a gas-reaction pressure of 2 atmospheres. The average carbon of the entire core was above the ladle analysis figure and was of the order of 0.17 pct. Further, it appeared that the average carbon of the inner part of the rim throughout the whole ingot, could be assumed to be about 0.07 pct. On this basis the average carbon content of the entire rim zone was found to be about 0.090 pct, that of the ingot as a whole 0.150 pct. Actually, this latter figure should normally be below the ladle carbon figure, in view of the concept that the reaction FeO + C is mainly responsible for the rimming action and for a decrease in the carbon content of the rim zone. It appears, therefore, the authors conclude, that the ladle carbon recorded was very low.

British EN Alloy Specifications

. . . Britain's wartime alloy situation was as serious as that in the U. S., and, like this country, Britain went into emergency specifications. These emergency steels are described herein, first in order to familiarize U. S. metallurgists with the types of alloys so developed, and second as a matter of record. Unique features were the dependence of specifications on physical properties rather than chemical analysis, and the discretionary powers given to metallurgists to authorize use of material not meeting specifications.

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By J. H. G. MONYPENNY

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THE war brought many problems to the steel industry in Britain, not the least being the common problem to most steel-producing countries—the shortage of steelmaking alloys. Practically all such alloys had to be imported, either in the crude or refined condition, and therefore required shipping space. It was thus essential that they should be used as effectively and economically as possible.

To this end, alloy steel scrap was carefully segregated from ordinary steel scrap and, where possible, was grouped into one or other of a number of different categories so that its alloy content could be used to the best advantage; steelmakers were rationed as regards their supplies of virgin alloys; and a strict control of the types of alloy steels which could be used for given purposes was instituted, this control being based on the EN specifications issued in 1941 as British Standard Schedule 970.

The EN specifications were drawn up by the Technical Advisory Committee to the Iron and Steel Control, Ministry of Supply, primarily for the purpose of rationalizing steel specifications. At the outbreak of war, some 2000 specifications covering the supply of rolled and forged steel were in use in Britain. Many of these specifications differed from others only in quite unimportant details and though efforts had been made in the two or three years prior to the war to reduce their number considerably, it needed the impact of war to remove from steel production this burden of unnecessary variations in requirements.

British steel specification 970 was issued in 1941, and concurrently, a companion volume, BSS971, was published which explained the basis of the selection of the various types of steels listed in BBS970 and gave much information regarding their properties. It should be emphasized at the outset that this schedule was intended to cover the supply of alloy and certain carbon steels in the form of bars, billets and forgings up to a maximum ruling section of 6 in. for general engineering purposes and for supplying the needs of the British fighting services. It does not deal with steel castings or with the bulk production of plates, sheets, tubes, angles and other special sections for general constructional purposes or with armor or with large forgings such as those required for guns or for boilers and other pressure vessels for power plant or for chemical engineering work. It may be noted that the few carbon steels included in BSS970 are of a type which had been in common use for many years by Britain's Ministry of Aircraft Production.

The EN specifications were drawn up on the basic principle—successfully used by the nation for many years—of specifying the mechanical properties to be obtained from the individual steels after stated forms of treatment. Requirements regarding composition were also included, but they were more in the nature of defining the type of steel to be used rather than of setting narrow limits in composition within which it had to be made. The specifications also emphasized a factor which, in earlier years, had frequently been ignored, namely that of mass. In those covering steels to be used in the hardened and tempered condition, the properties obtainable from a given steel were related to its size when heat-treated.

BSS970, as originally issued, listed 58 different steels; four others have since been added and five of the original 58 have been subdivided into two or more varieties. The specifications for a numbr of these steels listed in table I call for little further comment. They relate to carbon steels (containing up to 1.8 pct manganese and intended for use in the rolled or forged, normalized, cold worked or hardened and tempered conditions), spring steels, and two or three low alloy steels for certain special purposes. Thus EN11 is a direct-hardening steel for parts where strength and resistance to wear are required, for example, for cylinder liners or heavy gears. Two other groups, however, are of considerable interest as they are largely concerned with the drive for economy in steel making alloys. These groups comprise:

(1) EN16—30, 100 and 110; steels which, when suitably hardened and tempered, are capable of giving miniumum tensile strengths between 100,800 to 224,000 psi coupled with adequate ductility and toughness.

(2) EN32—39, 202; case-hardening steels.

The outstanding feature of the

TABLE I

EN Specifications, Carbon Steels, Spring Steels and Low Alloy Steels for Special Purposes

EN No.	Description	Composition Limits, Pct								Physical Properties			Remarks
		C	Si	Mn	S	P	Cr	Ni	Mo	Tensile Strength, Psi	Elongation, Pct	Izod Impact Values	
1	Free cutting steel bars for machining	0.20 max	0.10 max	0.60 to 1.20	0.20 to 0.30	0.10 max	—	—	—	62,720	14	—	If cold drawn or cold rolled
1A		0.07 to 0.15	0.10 max	0.80 to 1.20	0.20 to 0.30	0.07 max	—	—	—	56,000	26	—	Not cold drawn or cold rolled
2	Mild steel, rolled or normalized	0.15 to 0.25	0.05 to 0.20	0.40 to 0.80	0.06 max	0.06 max	—	—	—	68,720 to 78,400	25	—	
	Mild steel, cold drawn	0.025 max 0.25 to 0.30 0.30 to 0.35	0.05 to 0.20	1.25 max	0.06 max	0.06 max	—	—	—	78,400 to 100,800	15	—	Up to 1¼ in. 1¼ to 1¾ in. 1¾ to 3 in.
2A	Mild steel for cold processing	0.20 max	0.15 max	0.80 max	0.06 max	0.06 max	—	—	—	58,240 44,800	28 28	— —	Rolled or normalized Annealed
3	"20" carbon steel (hot rolled or forged)	0.25 max	0.10 to 0.35	1.00 max	0.06 max	0.06 max	—	—	—	56,000 to 78,400 68,720	25 17	— —	If cold drawn
4	"25" carbon steel, normalized	0.30 max	0.10 to 0.35	1.20 max	0.06 max	0.06 max	—	—	—	68,720 to 85,120	25	20	
5	"30" carbon steel, hardened and tempered	0.25 to 0.35	0.10 to 0.35	0.50 to 1.20	0.06 max	0.06 max	—	—	—	67,200 78,400	25 25	25 20	Impact values up to 2½ in. only
6	35 to 45-ton bright carbon steel	0.15 to 0.40	0.10 to 0.35	0.50 to 0.90	0.06 max	0.06 max	—	—	—	78,400 to 100,800	15	20 15 10	Up to ¾ in. ¾ to 1⅛ in. Over 1⅛ in.
7	35 to 45-ton bright carbon steel, free machining	0.10 to 0.30	0.10 to 0.35	0.50 to 1.75	0.10 to 0.30	0.06 max	—	—	—	78,400 to 100,800	15	20 15 10	Up to ¾ in. ¾ to 1⅛ in. Over 1⅛ in.
7A	Free machining and suitable for case hardening	0.12 to 0.18	0.25 max	1.00 to 1.50	0.08 to 0.15	0.06 max	—	—	—	78,400 to 100,800	15		
8	"40" carbon steel, hot rolled or normalized	0.30 to 0.45	0.10 to 0.35	1.50 max	0.06 max	0.06 max	—	1.00 max†	—	78,400 to 100,800	20	10	
9	"55" carbon steel, normalized or cold worked	0.50 to 0.60	0.10 to 0.35	0.50 to 0.80	0.06 max	0.06 max	—	—	—	100,800 112,000 to 145,000	18 12.5	— —	Normalized Cold rolled or drawn
10	"55" carbon steel, normalized, hardened and tempered	0.50 to 0.60	0.10 to 0.35	0.40 to 0.75	0.06 max	0.06 max	—	—	—	112,000 123,200	18 15	—	Test values up to 1⅛ in. only. For larger sizes, carbon content up to 0.70 pct max may be used
11	"60" carbon-chromium steel, hardened and tempered	0.50 to 0.70	0.10 to 0.35	0.50 to 0.80	0.05 max	0.05 max	0.50 to 0.80	—	—	123,200 145,000	15 12	25 12	Up to 2½ in. only
12	"40" carbon steel, hardened and tempered	0.30 to 0.45	0.10 to 0.35	1.50 max	0.06 max	0.06 max	—	1.00 max†	—	89,600	22	35 25	Below 4 in. 4 in. and over
13	Manganese-nickel-molybdenum steel, hardened and tempered	0.15 to 0.25	0.10 to 0.35	1.40 to 1.80	0.05 max	0.05 max	—	0.40 to 0.70	0.15 to 0.35	89,600	22	40	All sizes up to 6 in.
14	Carbon-manganese steel	0.20 to 0.30	0.10 to 0.35	1.30 to 1.80	0.06 max	0.06 max	—	0.40 max	—	85,120 89,600 100,800	20 20 20	— 35 30	Normalized, all sizes up to 6 in. Up to 4 in. Hardened and tempered. Up to 2½ in. Hardened and tempered.
15	Carbon-manganese steel, higher tensile, hardened and tempered	0.30 to 0.40	0.10 to 0.35	1.30 to 1.70	0.06 max	0.06 max	—	—	—	89,600 100,800 112,000	22 20 20	35 30 30	Up to 6 in. Impact 4 in. and over 25 min. Up to 2½ in. Up to 7⅞ in.
31	1 pct carbon-chromium steel	0.90 to 1.20	0.10 to 0.35	0.30 to 0.75	0.05 max	0.05 max	1.00 to 1.60	—	—	—	—	—	In the softened condition, Brinell 229 max
42	Carbon spring steel, oil hardening	0.75 to 0.90	0.10 to 0.40	0.35 to 0.70	0.06 max	0.06 max	—	—	—	—	—	—	Material must give Brinell hardness of 341 to 429 when put in the final heat treated condition
43	Water hardening	0.45 to 0.65	0.10 to 0.35	0.50 to 1.00	0.06 max	0.06 max	—	—	—	—	—	—	
44	Oil hardening	0.90 to 1.20	0.10 to 0.35	0.45 to 0.75	0.06 max	0.06 max	—	—	—	—	—	—	
45	Silicon-manganese spring steel, oil hardening	0.50 to 0.60	1.50 to 2.00	0.70 to 1.00	0.05 max	0.05 max	—	—	—	—	—	—	
46	Water hardening	0.35 to 0.50	1.50 to 2.00	0.60 to 1.00	0.05 max	0.06 max	—	—	—	—	—	—	
47*	Chromium-vanadium spring steel, oil hardening	0.45 to 0.55	0.10 to 0.50	0.50 to 0.80	0.05 max	0.06 max	0.80 to 1.20	—	V 0.15	—	—	—	
48	Chromium spring steel, oil hardening	0.45 to 0.55	0.10 to 0.50	0.50 to 0.80	0.05 max	0.06 max	1.00 to 1.40	—	—	—	—	—	
49	Hard-drawn carbon steel wire for valve springs*	0.70 to 0.80	0.10 to 0.35	1.00 max	0.04 max	0.04 max	—	—	—	212,800 to 238,810	—	—	Reverse bend test also required
50	Chromium-vanadium steel wire for valve springs, hardened and tempered	0.40 to 0.50	0.10 to 0.35	0.50 to 0.70	0.04 max	0.04 max	1.00 to 1.50	—	V 0.15	211,600 to 246,400	—	—	Reverse bend test also required

* May not be used except under special license from the Iron and Steel Control. † At the option of the steelmaker.
Note: All figures are minimum unless otherwise marked.

specifications in group (1) is the emphasis on mass effects. Each specification gives the limiting sizes up to which the particular steel, when hardened and tempered within specified temperature limits, can be given certain standard ranges of physical properties which are shown in table II. Each of these ranges has mimimum requirements as regards tensile strength pct of elongation, and Izod impact value. In addition, suitable Brinell values—for checking uniformity among a batch of bars or forgings—and representative minimum yield point values are given, though it should be noted that the

TABLE II

EN Specifications, Standard Ranges of Physical Properties For Hardened and Tempered Alloy Steels

Symbol	Tensile Strength, Psi	Yield Point, Psi, Min	Elongation, Pct, Min	Izod Impact, Ft-Lb, Min	Brinell Hardness
R	100,800 to 123,200	78,160[a]	22	40	192 to 269
S	112,000 to 134,400	85,120	20	40	217 to 293
T	123,200 to 145,600	98,560[b]	18	40[c]	241 to 311
U	134,400 to 156,800	107,520	17	35	262 to 341
V	145,600 to 168,000	116,480[d]	16	35	285 to 352
W	156,800 to 179,200	129,920	15	30	302 to 375
X	168,000 to 190,400	141,120	14	25	332 to 402
Y	179,200 to 201,600	152,320	14	25	352 to 429
Z	224,000 min	190,400	10[e]	10[e]	444 min

a 32 for EN 18 and EN 21. *b* 40 for EN 20. *c* 35 for EN 22. *d* 55 for EN 20. *e* 8 for EN 24.

TABLE III

EN Specifications, Medium and High Tensile Alloy Steels

EN No.	Description	Composition,† Pct						For the Undernoted Tensile Ranges, in Psi, up to the Limiting Sizes Indicated							
		C	Si	Mn	Ni	Cr	Mo	100,800 to 123,200	112,000 to 154,400	123,200 to 145,800	134,400 to 156,800	145,600 to 168,000	156,800 to 179,200	168,000 to 190,400	179,200 to 201,600	224,000 min
16	Manganese-molybdenum steel	0.25 to 0.40	0.10 to 0.35	1.30 to 1.80	—	—	0.20 to 0.35	6 in.	4 in.	2½ in.	1½ in.	⅞ in.	—	—	—	—
17	Manganese-molybdenum steel (higher Mo)	0.30 to 0.40	0.10 to 0.35	1.30 to 1.80	—	—	0.35 to 0.55	6 in.	6 in.	4 in.	2½ in.	1⅛ in.	—	—	—	—
18	1 pct chromium steel	0.35 to 0.45	0.10 to 0.35	0.60 to 1.20	—	1.80 to 1.20	—	4 in.	2½ in.	1⅛ in.	—	—	—	—	—	—
19	1 pct chromium-molybdenum steel	0.35 to 0.45	0.10 to 0.35	0.50 to 0.80	—	0.90 to 1.50	0.20 to 0.40	6 in.	4 in.	2½ in.	2½ in.	1⅛ in.	1⅛ in.	—	—	—
20*	1 pct chromium-molybdenum (higher Mo)	0.22 to 0.50	0.10 to 0.35	0.40 to 0.80	0.30 max	0.50 to 1.50	0.40 to 1.00	—	—	2½ in.	—	1⅛ in.	—	—	—	—
21*	3 pct nickel steel	0.25 to 0.35	0.10 to 0.35	0.35 to 0.75	2.75 to 3.50	0.30 max	—	4 in.	2½ in.	—	—	—	—	—	—	—
22*	3½ pct nickel steel	0.35 to 0.45	0.10 to 0.35	0.50 to 0.80	3.25 to 3.75	0.30 max	—	—	4 in.	2½ in.	—	—	—	—	—	—
23*	3 pct nickel-chromium steel	0.25 to 0.35	0.10 to 0.35	0.45 to 0.75	2.75 to 3.50	0.50 to 1.00	0.65 max‡	—	6 in.	6 in.	6 in.	2½ in.	—	—	—	—
24	1½ pct nickel-chromium-molybdenum steel	0.35 to 0.45	0.10 to 0.35	0.45 to 0.70	1.30 to 1.80	0.90 to 1.40	0.20 to 0.35	—	6 in.	6 in.	4 in.	2½ in.	1⅛ in.	1⅛ in.	1⅛ in.	1⅛ in.
25	2½ pct nickel-chromium-molybdenum steel	0.27 to 0.35	0.10 to 0.35	0.50 to 0.70	2.30 to 2.80	0.50 to 0.80	0.40 to 0.70	—	—	6 in.	6 in.	6 in.	4 in.	2½ in.	2½ in.	2½ in.
26	2½ pct nickel-chromium-molybdenum steel (high carbon)	0.36 to 0.44	0.10 to 0.35	0.50 to 0.70	2.30 to 2.80	0.50 to 0.80	0.40 to 0.70	—	—	—	6 in.	6 in.	6 in.	6 in.	6 in.	4 in.
27*	3 pct nickel-chromium-molybdenum steel	0.25 to 0.35	0.10 to 0.35	0.70 max	3.00 to 3.75	0.50 to 1.30	0.20 to 0.65	—	—	6 in.	6 in.	6 in.	4 in.	—	—	—
28*	3½ pct nickel-chromium-molybdenum steel	0.25 to 0.40	0.10 to 0.35	0.70 max	3.00 to 4.50	0.75 to 1.50	0.20 to 0.65	—	—	—	6 in.	6 in.	4 in.	—	2½ in.	—
29*	3 pct chromium-molybdenum steel	0.15 to 0.35	0.10 to 0.35	0.65 max	0.40 max	2.50 to 3.50	0.30 to 0.70	6 in.	6 in.	6 in.	6 in.	4 in.	4 in.	—	—	2½ in.
30	4½ pct nickel-chromium steel	0.25 to 0.35	0.10 to 0.35	0.35 to 0.65	3.75 to 4.50	1.00 to 1.50	0.60 max	—	—	—	—	—	—	—	—	2½ in. if AH 6 in. if OH
100	Low-alloy steel	0.35 to 0.45 a	0.50 max	1.20 to 1.50	0.50 to 1.00	0.30 to 0.60	0.15 to 0.25	6 in.	4 in.	2½ in.	1⅛ in.	1⅛ in.	—	—	—	—
110	Low nickel-chromium-molybdenum steel	0.35 to 0.45	0.10 to 0.35	0.40 to 0.80	1.20 to 1.60	0.90 to 1.40	0.10 to 0.20	6 in.	6 in.	4 in.	2½ in.	1⅛ in.	1⅛ in.	—	—	—

† Sulfur and phosphorus 0.05 pct max. each in all cases. * May not be used except under special license from the Iron and Steel Control. AH = Air hardened. OH = Oil hardened. *a* Carbon down to 0.25 pct may be used for minimum tensile strengths of 100,800 and 112,000 psi. ‡ Optional with producer.

latter are not intended to be used as acceptance values except by special arrangement between the purchaser and manufacturer. It should also be noted when the yield point is all defined—as frequently happens with steels having tensile strengths higher than 112,000 psi—the value to be taken is the "proof stress" corresponding to 0.5 pct permanent elongation.

Table II lists all the high-tensile alloy steels included in EN series and the limiting sizes up to which they can be given the indicated ranges of tensile strength plus minimum ductility and toughness values. Some of these steels are better known than others but all, except EN100, had been in use before the war.

When EN970 was first issued, shortages of steel-making alloys were becoming very evident and as it is obvious from table III that, weight for weight, some alloys or combinations of alloys are far more efficient than others in producing desired properties. Thus nickel by itself is far less efficient in this respect than many engineers have believed in the past. It was not long before the use of certain steels was prohibited, except under special licence, by the Iron and Steel Control of the Ministry of Supply. The EN numbers of such steels are marked with an asterisk in table III. The use of the other steels was restricted to purposes where certain ranges of tensile strength were required in pieces of certain minimum sizes.

The list of the "permitted steels" has been modified to some extent since it was first issued, but at present is as set out in table IV. It is based on the principle that a particular alloy composition should not be used for a given size of bar or forging if the desired properties could be obtained in that bar or forging from a steel of lower alloy content. A study of this table will also show that it introduced a conception new to many engineers and other steel users—that when material of some stated tensile strength was required, the actual steel to be used depended on the size of the article in which this strength was required at the time it was heat treated.

Originally, before specifications EN-100 and 110 were drafted, alloy economy in Britain was based largely on the extended use of manganese, chromium, manganese molybdenum and chromium-molybdenum steels (EN14, 15, 16, 17, 18 and 19). This, however, led to considerably increased requirements of these three alloys in virgin form because relatively little scrap of these types was available (and in any case, manganese is largely lost, and chromium to a less extent, on remelting).

On the other hand, much scrap containing valuable amounts of nickel and chromium, together sometimes with molybdenum, was available, resulting from the working up of steels containing these alloys. This scrap

TABLE IV

Bars, Billets, Light Forgings and Stampings Up to 6 in. Ruling Section. Permitted Steels for Hardening and Tempering to Give Tensile Strengths of 89,600 to 224,000 Psi.

	Composition						Limiting Sizes for Tensile Strengths, in Psi, of:								
EN No.	C	Si	Mn	Ni	Cr	Mo	89,600 to 112,000	100,800 to 123,200	112,000 to 134,400	123,200 to 145,600	134,400 to 156,800	145,600 to 168,000	156,800 to 179,200	179,200 to 201,600	224,000 Min.
12	0.30 to 0.45	0.10 to 0.35	1.5 max	1.0 max‡	—	—	(Inches) above 4 up to 6 (a)	(Inches) —	(Inches) —	(Inches) —	(Inches) —	(Inches) —	(Inches) —	(Inches) —	(Inches) —
13	0.15 to 0.25	0.10 to 0.35	1.4 to 1.8	0.4 to 0.7	—	0.15 to 0.35	All sizes	—	—	—	—	—	—	—	—
14	0.20 to 0.30	0.10 to 0.35	1.3 to 1.8	0.40 max	—	—	up to 4	up to 2½	—	—	—	—	—	—	—
15	0.30 to 0.40	0.10 to 0.35	1.3 to 1.7	—	—	—	above 4 up to 6	up to 2½	up to ⅞	—	—	—	—	—	—
16	0.25 to 0.40	0.10 to 0.35	1.3 to 1.8	—	—	0.20 to 0.35	—	above 2½ up to 6	above ⅞ up to 4	up to 2½	up to 1⅛	up to ⅞	—	—	—
17	0.30 to 0.40	0.10 to 0.35	1.3 to 1.8	—	—	0.35 to 0.55	—	—	above 4 up to 6	above 2½ up to 4	above 1⅛ up to 2½	above ⅞ up to 1⅛	—	—	—
18	0.35 to 0.45	0.10 to 0.35	0.6 to 1.2	—	0.8 to 1.2	—	—	above 2½ up to 4	up to 2½	up to 1⅛	—	—	—	—	—
19	0.35 to 0.45	0.10 to 0.35	0.5 to 0.8	—	0.9 to 1.5	0.20 to 0.40	—	above 2½ up to 6	above ⅞ up to 4	up to 2½	above 1⅛ up to 2½	above ⅞ up to 1⅛	up to 1⅛	—	—
24	0.35 to 0.45	0.10 to 0.35	0.45 to 0.7	1.3 to 1.8	0.9 to 1.4	0.20 to 0.35	—	—	—	above 4 up to 6	above 2½ up to 4	above 1⅛ up to 2½	up to 1⅛	up to 1⅛	up to 1⅛ if OH
25	0.27 to 0.35	0.10 to 0.35	0.5 to 0.7	2.3 to 2.8	0.5 to 0.8	0.4 to 0.7	—	—	—	—	above 4 up to 6	above 2½ up to 6	above 1⅛ up to 4	above 1⅛ up to 2½	above 1⅛ up to 2½ if OH
26	0.36 to 0.44	0.10 to 0.35	0.5 to 0.7	2.3 to 2.8	0.5 to 0.8	0.4 to 0.7	—	—	—	—	above 4 up to 6	above 2½ up to 6	above 1⅛ up to 6	above 1⅛ up to 6	above 1⅛ up to 4 if OH
30	0.25 to 0.35	0.10 to 0.35	0.35 to 0.60	3.75 to 4.5	1.0 to 1.5	0.65 to max‡	—	—	—	—	—	—	—	—	up to 2½ if AH 4 to 6 if OH
100	0.35 to 0.45	0.5 max	1.2 to 1.5	0.5 to 1.0	0.3 to 0.6	0.15 to 0.25	—	above 2½ up to 6	above ⅞ up to 4	up to 2½	up to 1⅛	up to 1⅛	—	—	—
110	0.35 to 0.45	0.10 to 0.35	0.4 to 0.8	1.2 to 1.6	0.9 to 1.4	0.10 to 0.20	—	—	above 4 up to 6	above 2½ up to 4	above 1⅛ up to 2½	—	—	—	—

a When supplied without nickel, all sizes up to 6 in. AH = Air hardened. OH = Oil hardened. ‡ Optional with producer.

TABLE V

EN Specifications, Case-Hardening Steels

EN No.	Type of Steel	Composition, Pct								Heat Treatment After Blank Carburizing[a]		Properties in 1⅛ In. Bar		
		C	Si	Mn	S	P	Ni	Cr	Mo	Refine at, °F	Harden at, °F	Tensile Strength, Psi	Elongation, Pct	Izod Impact Ft-Lb
32	Carbon	0.2 max	0.10 to 0.35	0.4 to 1.0	0.07 max	0.07 max	—	—	—	1652	1400 to 1436 in water	71,680	20	40
33	3 pct nickel	0.16 max	0.10 to 0.35	0.2 to 0.6	0.06 max	0.05 max	2.75 to 3.5	0.30 max	—	1580 to 1616	1400 to 1436 in water	100,800	18	40
34	2 pct nickel-molybdenum	0.14 to 0.20	0.10 to 0.35	0.3 to 0.6	0.05 max	0.05 max	1.5 to 2.0	—	0.20 to 0.30	1580 to 1616	1400 to 1436 in oil	100,800	18	40
35	2 pct nickel-molybdenum	0.20 to 0.28	0.10 to 0.35	0.3 to 0.6	0.05 max	0.05 max	1.5 to 2.0	—	0.20 to 0.30	1580 to 1616	1400 to 1436 in oil	123,200	15	25
36	3 pct nickel-chromium	0.18 max	0.10 to 0.35	0.3 to 0.6	0.05 max	0.05 max	3.0 to 3.75	0.6 to 1.1	—	1580 to 1616	1400 to 1436 in oil	123,000 to 168,000[b] 145,600 to 179,200[b]	15 13	35 30
37*	5 pct nickel	0.16 max	0.10 to 0.35	0.45 max	0.05 max	0.05 max	4.5 to 5.2	0.30 max	—	1526 to 1598	1384 to 1400 in oil	89,600 to 134,400	20	50
38*	5 pct nickel	0.16 max	0.10 to 0.35	0.60 max	0.05 max	0.05 max	4.5 to 5.5	0.30 max	0.15 to 0.30**	1526 to 1598	1400 to 1436 in oil	145,600	13	30
39	4¼ pct nickel-chromium	0.12 to 0.18	0.10 to 0.35	0.50 max	0.05 max	0.05 max	3.8 to 4.5	1.0 to 1.4	0.15 to 0.35**	1526 to 1598	1400 to 1436 in oil*	190,400	12	25
201	Carbon-manganese	0.12 to 0.18	0.10 to 0.35	1.25 to 1.75	0.06 max	0.06 max	—	—	—	1598 to 1652	1418 to 1454 in oil or water	89,600	20	40
202	Carbon-manganese (free machining)	0.12 to 0.18	0.10 to 0.35	1.25 to 1.75	0.08 to 0.15	0.06 max	—	—	—	1598 to 1652	1418 to 1454 in oil or water	89,600	18	30

a The carburizing procedure without the carburizing medium. *b* The user to state, when ordering, which range of tensile strength he requires. *c* The pieces to be subsequently tempered at a temperature not exceeding 392°F. Note: All figures are minima unless otherwise marked. * May not be used except under special license from the Iron and Steel Control. ** Optional with producer.

tended to become a drug on the market because it could be used only for purposes for which the higher nickel-chromium - molybdenum steels were permitted.

In this connection it may be noted that, for some years, the steels most used in aircraft and aircraft engine construction had been those with a tensile strength of 123,200 to 145,600 psi, and that much of this material had been supplied to British Standard Specification S.11 which called for steel of the following composition:

Pct

Carbon, 0.25 to 0.35
Silicon, 0.30 max.
Manganese, 0.45 to 0.70
Nickel, 2.75 to 3.72
Chromium, 0.50 to 1.00
Molybdenum, 0.65 optional.

As a result of this scrap position, specification EN100 was issued in January 1943, and EN110 the following August at which date also some slight modifications were made in the requirements of EN100. Steels to these two specifications were suitable when medium and high tensile strengths were required in sizes for which previously only manganese-molybdenum and chromium-molybdenum steels had been permitted, and they provided a means for the effective use of the nickel-chromium scrap.

It will be seen that in both these specifications the specified ranges of composition are reasonably wide except as regards molybdenum, the content of which was purposely kept low and within narrow limits in order to cut down to a minimum additions of this metal in virgin form. Alloy steel scrap is a variable raw material and, incidentally, not always easy to sample adequately. In fact, the only certain way, in some cases, may be to melt it down as a furnace charge and then sample the molten bath. It might or might not then be possible to finish off such a charge so that the composition of the material tapped lay within some narrow specified limits, but the probability that it could be brought to a composition which, after heat treatment in a specified manner, would possess certain required physical properties, would undoubtedly be much greater. After all, if a steelmaker is instructed to use as much alloy steel scrap as possible and, at the same time, has a strictly rationed supply of virgin alloy, restrictions must be eased somewhere.

Table V gives details regarding the EN specifications for case hardening steels. It will be noted that only two additions (EN201 and 202) have been made to the original list of these steels and that two of the latter—those containing 5 pct nickel and marked with an asterisk in the table V—could not be used except under special license from the Iron and Steel Control. The two additions cover steels containing about 1.5 pct manganese, one of them being a free-machining steel, and are intended for core strengths of not less than 89,600 psi. Even under "control," nickel remained the key alloy for obtaining high core strength in case-hardening steels though its content has been reduced in some cases as a result of partial replacement by chromium or molybdenum or both.

Table V differs from table III in that it contains no reference to mass effects. This does not mean that such effects are not present or are ignored. It merely follows the standard practice, in British specifications for case-hardening steels, of relating composition to the physical properties obtained from a standard sized bar—actually 1⅛ in. diameter—after a specified heat treatment. It may be of interest to note that this specified heat treatment consists of "blank carburizing," that is, heating the test bars at the carburizing temperature, but without the carburizing medium,

for the normal period of a carburizing operation, then refining and finally hardening at the temperatures given for each steel in table V.

Such a test indicates whether the steel possesses the normal tensile strength, ductility and toughness for its composition when subjected to the ordinary case hardening treatment. If the bar to be tested is smaller than the standard 1⅛ in. diameter, the physical properties called for in the particular specification may be modified, the extent of the modification being determined, if necessary, by experiments on test bars of similar material 1⅛-in. diam and the size of the test bar respectively.

The remaining specifications in the EN series cover what may be described as special purpose steels; they comprise steels for nitriding, for the valves of internal combustion engines and corrosion-resisting steels. Details of the main requirements regarding these steels are set out in table VI and call for little comment. The small number of these special purpose steels is accounted for by the fact that the EN series of specifications was designed to cover steels required for general engineering work, but was not intended to deal completely with the requirements for such special purposes as chemical engineering, service at elevated temperatures, thermostatic control and the like.

Reference has already been made to the fact that composition limits given in the EN specifications have purposely been drawn rather wide, the basic principle of the specifications being to insure the supply of material having required properties rather than a specified composition within narrow limits. The matter actually was carried still further during the emergency war period by authorizing Britain's Technical Advisory Committee to approve the selection of an experienced metallurgist in each steelmaking company who should have discretionary powers to authorize the use of material even if its composition was somewhat outside the specified limits—provided that it possesses the required physical properties. In such cases, the relevant facts were to be recorded on the test certificate. The approved metallurgist had also similar discretionary powers regarding minor departures from the limiting sizes given in table IV.

TABLE VI

EN Specifications, Nitriding Steels, Valve Steels, Stainless Steels

EN No.	Type	Composition, Pct								Physical Properties					Remarks
		C	Si	Mn	Ni	Cr	Al	Mo	Others	Yield Point, Psi	Tensile Strength, Psi	Elongation, Pct	Izod Impact, Ft-Lb	Brinell No.	
40	3 Pct chromium-molybdenum nitriding steel	0.15 to 0.35	0.10 to 0.35	0.65 max	0.40 max	2.5 to 3.5	—	0.3 to 0.7	V—0.25 max*	76,160	100,800	22	45	192 to 269	Up to 6 in.
										85,120	112,000	20	40	217 to 293	Up to 6 in.
										98,560	123,200	18	40	241 to 311	Up to 6 in.
										107,520	134,400	17	35	262 to 341	Up to 4 in.
41	1½ Pct chromium-aluminum-molybdenum nitriding steel	0.18 to 0.45	0.10 to 0.45	0.65 max	0.40 max	1.4 to 1.9	0.9 to 1.3	0.10 to 0.25	—	53,760	78,400 to 100,800	24	45	140 to 223	Impact values up to 2½ in. only
										71,680	100,800 to 123,200	20	40	192 to 269	
										94,080	123,200 to 145,600	17	35	241 to 311	
51	3 Pct nickel valve steel	0.25 to 0.35	0.10 to 0.35	0.35 to 0.75	2.75 to 3.5	0.30 max	—	—	—	—	—	—	40	229 max	
52	Silicon-chromium valve steel	0.40 to 0.50	3.0 to 3.75	0.3 to 0.6	0.50 max	7.5 to 9.5	—	—	—	—	—	—	—	255 to 293	
53	Silicon-chromium valve steel	0.55 to 0.65	1.4 to 1.7	0.3 to 0.6	0.50 max	5.75 to 6.75	—	—	—	—	—	—	12	235 to 285	
54	Nickel-chromium-tungsten valve steel	0.35 to 0.50	1.0 to 2.5	1.5 max	10.0	12.0 to 16.0	—	—	W—2.0 to 4.0	—	—	—	15	302 max	
55	Chromium-nickel-tungsten valve steel	0.18 to 0.45	1.0 to 2.5	1.0 max	6.0 to 12.0	17.0	—	—	W—2.0 to 4.0	—	—	—	20	302 max	
56	Chromium rust-resisting steel	0.15 to 0.35	0.10 to 1.0	1.0 max	1.0 max	12.0	—	—	(a)* — S 0.75 max Se 0.6 max Zr 0.6 max Mo 0.6 max Pb 0.35 max	—	100,800	20	25 / 20	192 to 269	Up to 2 in. Over 2 in.
56 M	Chromium rust-resisting steel, free machining	0.15 to 0.35	0.10 to 1.0	1.0 max	1.0 max	12.0	—	—							
56 A	Low-carbon-chromium rust-resisting steel	0.15 max	0.10 to 1.0	1.0 max	1.0 max	12.0	—	—	(a)* — S 0.75 max Se 0.6 max Zr 0.6 max Mo 0.6 max Pb 0.35 max	—	78,400 to 100,800	25	45 / 25	140 to 223	Up to 2 in. Over 2 in.
56 AM	Free machining	0.15 max	0.10 to 1.0	1.0 max	1.0 max	12.0	—	—							
56 AI	For turbine blading	0.12 max	0.10 to 1.0	1.0 max	1.0 max	12.0	—	—	—						
57	High-tensile chromium-nickel rust-resisting steel	0.25 max	0.10 to 1.0	1.0 max	1.0 min	15.5 to 20.0	—	—	—	—	123,200	15	20	241	
58	Austenitic chromium-nickel rust and acid-resisting steel	0.20 max	0.2	1.0 max	6.0 to 20.0	12.0	—	*	*W,Ti, Cu Cb,V,Ta	33,500	78,400	30	50	—	Test for freedom from intergranular corrosion also required
58 A	Austenitic chromium-nickel rust and acid-resisting steel	0.20 max	0.2	1.0 max	8.0 to 10.0	16.0 to 20.0	—	*	*W,Ti,Cu, Cb,V,Ta						

a The total content of Se, Zr, Mo and Pb not to exceed 1.0 pct. * At the option of the manufacturer. Note: All figures are minima unless otherwise marked.

COOLING bed in the 12-in. bar mill at Bethlehem Steel Co.'s Lackawanna plant. Similar facility will be installed in the new 10-in. mill.

Bethlehem Centralizes Bar Mills

RECOGNIZING that the arrangement of a series of mills in one area represents the most efficient operating condition, the Bethlehem Steel Co. is completing plans for extensive bar production facilities adjacent to its existing 12-in. mill at Lackawanna, N. Y.

Included in improvements in the production of billets and bars is a continuous high-speed 10-in. merchant bar mill which will share in a centralized billet storage and preparation yard, and common finishing and shipping departments. This is one of the steps in Bethlehem's plan to group all bar production in one location, a plan dating back to 1940 when the 12-in. mill was built at Lackawanna. The new mill will have a rated monthly capacity of 22,000 tons, in sizes from 5/6 to 1½ in. rounds, practically the same as the combined capacity of the present 8-in. and 10-in. mills which it will replace.

To improve the quality of alloy and carbon steel bars, careful attention has been given to such essentials as good heating, continuous scarfing at the bloom stage, elimination of the twist between stands which has a tendency to open seams and finally, proper cooling and surface preparation of the billet.

In line with the consolidation of the bar mills the entire load of billets for bar production will be transferred to the 40/30/21-in. mills. At present, all high-grade carbon and alloy billets are rolled on the 44/32-in. mills. The new arrangement will permit a better distribution of the load on the different blooming mills at the plant, a highly desirable objective when the production of slabs and blooms for continuous sheet-strip, structural steel, and rails will again be back to normal proportions.

To equip the 40/30/21-in. mill combination to handle the entire billet production for the bar mills, including alloy and special grades, many changes and additions will be required. Proper ingot heating will be attained by adding three five-hole blocks of 20x7½x11-ft soaking pits at the 40-in. bloomer. A continuous hot-scarfing machine will be installed at the delivery end of the 40-in. mill.

In the 30-in. continuous billet mill following the 40-in. bloomer three of the six stands will be replaced by vertical stands to eliminate twisting of the billets between stands. This feature is particularly important in the rolling of alloy steels. On the remaining three horizontal stands alterations will be made to increase the speed of the screw-downs.

The 30-in. mill when altered will roll 3⅞x3⅞, 4x4, 5x5, and 6x6 in. billets, in lengths varying from 6 ft to 30 ft, slabs 7x2⅝, 7x2⅝, 11x3, and 12x2 in., in lengths from 7 to 15 ft; and tube rounds of 3 to 8 in. diam, from 15 to 30 ft long. A 60-in. hot saw will cut the billets and tube rounds into desired lengths.

Directly in line with the 30-in. mill is a six-stand, 21-in. billet mill, producing the following sizes: 1¾x1¾, 2½x2½ and 3x3 in., in lengths of 12 ft to 30 ft. No change will be made in the mill proper, but a new steam-operated flying shear will be installed at the exit of the last stand to provide flexibility in the cut lengths of billets for the trade and for rerolling.

The layout of the bar division has been made with the thought of eventually including in that location a new mill for sizes larger than 12-in. mill range.

New Equipment . .

Heat Treat

. . . In this week's issue are described interesting developments in heat treating, including alloy fans, butterfly valves, high frequency tube, induction heater, master induction coil, and several types of furnaces.

CLOSER control of the effects of water vapor in air or other gaseous mixtures is afforded by a dew-point recorder announced by *Surface Combustion*, Toledo 1. The recorder is applicable for furnaces utilizing prepared gas atmospheres, or wherever dehydrated air or a gas mixture of controlled moisture content is desirable, as in the chemical and food processing industries, drug preparation, etc. This recorder is said to provide a continuous record of humidity within a temperature range of from minus 70° to plus 60° F. Adjustments of the various constituent gases in the atmosphere can be made to compensate for differences in humidity, or

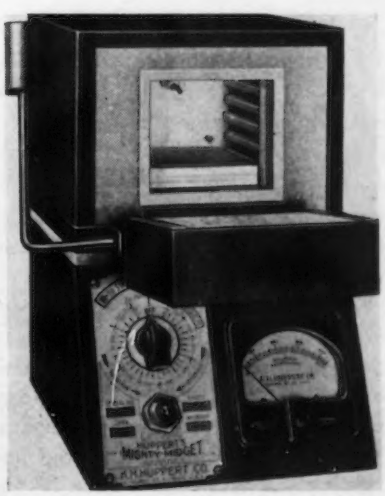
if humidity control of the air or gaseous atmosphere is used, permanent information concerning its dew point is provided. The recorder applies the familiar principle of the dew-point cup for determining the humidity of air and other gaseous mixtures. Its operation is independent of the nature or composition of the gases making up the atmosphere. The presence of impurities in the furnace gases, such as hydrogen sulphide and sulphur dioxide have no effect upon its accuracy. An analysis of the furnace gas is unnecessary. The principal units of the recorder are a dew-point cup with mirrored surface which can be refrigerated at varying temperatures, a thermocouple which is connected to a recording potentiometer, and the refrigerating unit with its associated circulating system.

Electronic Heater Announced

THE Climax High Frequency Heater has recently been announced by the *Climax Engineering Co.*, Clinton, Iowa. This product is said to provide quick, efficient, localized heat for surface hardening, annealing and brazing. It is adaptable for the food industry with proved applications in sterilization, pasteurization, deactivation of enzymes, cooking and heating, baking, destroying infestations, packaging and sealing. This method may be applied to all nonmetallic materials. It is claimed that use of electronic heating results in improved quality of the product through uniform heating, no redistribution of moisture, less handling and speedier production, reduction in labor, packaging and glue costs, reduces inventory and saves floor space. Chemical contamination is avoided completely.

Electric Laboratory Furnace

EQUIPPED with built-in, precision automatic temperature control, an electric laboratory or small unit production furnace called the Mighty Midget has been announced by *K. H. Huppert Co.*, 6830 Cottage Grove Ave.,

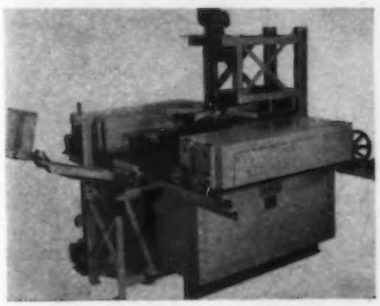


Chicago 37. Temperature controls maintain desired temperatures in the 200° to 1750° F. It is claimed low operating costs are a result of precision temperature control, which balances power input to heat demand. The furnace operates on 110 v ac with current consumption of 500 w. All steel construction, multi-insulation, special high temperature alloy elements, indicator light, and indicating pyrometer, together with incorporation of stepless temperature control into the basic furnace design are other features. It is designed to be used in laboratories and precision pro-

duction fields, with possible uses in the dental field for heat treating and wax elimination.

Salt Bath Furnace

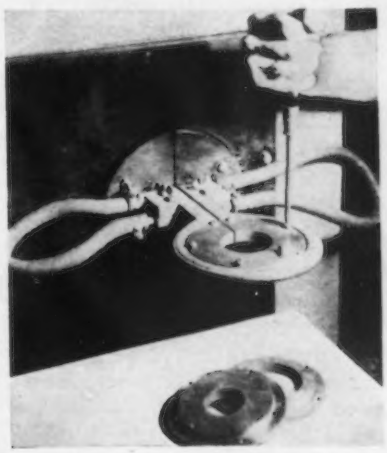
AN Ajax-Hultgren salt bath furnace, has been announced by *Ajax Electric Co., Inc.*, Frankford Ave. at Delaware Ave., Philadelphia 23. This furnace automatically removes baskets laden with small work such as nuts, rivets, screws, grease fittings, washers, links, fasteners, etc., upon completion of the hardening heat treatment in the molten salt. The principle of operation is that a specially devised motor driven mechanism rotates five heat-resisting alloy wire baskets through the liquid bath. Each basket remains in the furnace for an identical period of time, which may be adjusted by means of a controlling time switch for any time cycle de-



sired. Parts to be heat treated may be either manually or automatically loaded into the baskets. It is said that work is given uniform treatment thus reducing possibilities of spoilage due to uneven heat treatment from batch to batch. Also, mechanical handling, with all operations automatically actuated and electrically interlocked, prevents any occurrence of manual errors and assures maximum heat treating production up to the furnace capacity. It takes up less floor space and requires less attending labor.

Master Induction Coil

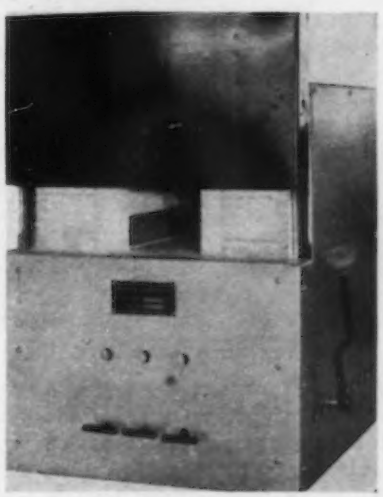
A MASTER coil with removable inserts which practically eliminates the problems of coil changing in setting up thermonic equipment for various induction heating applications, has been announced by the *Induction Heating Corp.*, 389 Lafayette St., N. Y. These inserts can be changed in a matter of seconds and are now available in complete sets which will accommodate diameters ranging from ⅛ in. to 3 in. in small increments. The inserts can be of any desired thickness, thus making the coils capable of heating axial bands of various widths to produce the many heat patterns possible with induction heating. This master coil lends itself to the experimental work which is involved in designing a production coil for a given



application. Although this coil is designed for experimental work, it is so constructed that it can take the abuse inherent to production runs, and is claimed to increase the flexibility of induction heating equipment.

Bench Furnace

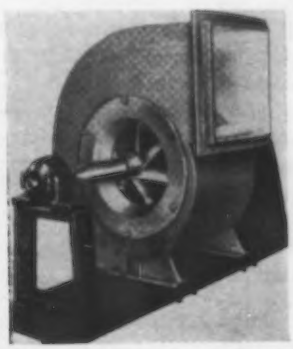
A THREE-WAY bench type Universal Laboratory Furnace has been announced by *Surface Combustion Corp.*, Toledo 1. The furnace combines three different types of furnaces in one casing. It may be used as a direct-fired oven unit at temperatures from 300° to 2400° F. For direct heating a muffle can be placed on the hearth, and if an atmosphere is desired a diamond block can be used in the muffle. A removable plug built into the arch of the furnace provides a means of inserting a pot. This laboratory furnace is said to be ideal for small shops or laboratories where a



wide variety of heat treatments in relatively small quantities of small parts must be performed. Such operations as annealing, carburizing, hardening, cyaniding and tempering, with or without a furnace atmosphere can be handled by the one furnace. It functions as a direct-fired oven, indirect heated muffle, gaseous atmosphere, salt or lead bath type and may also be used for melting soft and light metals such as tin, lead, aluminum, magnesium, etc.

Alloy Fans

AN extended line of high temperature heat-resistant alloy fans has been announced by *Michiana Products Corp.*, Michigan City, Ind. These fans are designed for handling hot gases or products of combustion in heat conservation systems in industrial plants, for annealing, hardening, drawing, stress relieving, galvanizing, tin-plating and many other types of furnaces, as well as for ceramic plants, soaking pits and the like,

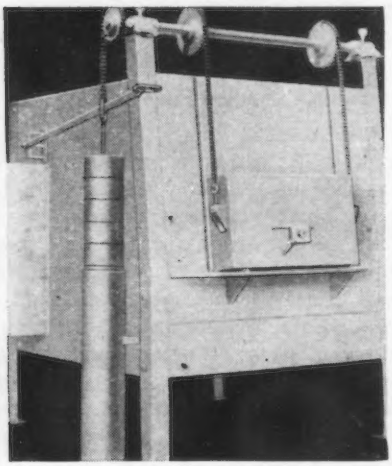


where temperature requirements range from as high as 1800° F. These fans also provide controlled recirculation, utilized to hold furnace temperatures within close limits and provide the flexibility required in program heating and cooling. They are said to embody novel principles of design and construction, and to be capable of operating at temperatures up to the limit of the heat-resistant alloys used in their construction. Fans are available with double or single inlet wheels and can be made of any castable alloy to meet requirements.

Bath Furnaces

A COMPLETE line of standard oven or hearth type batch furnaces has been announced by *W. S. Rockwell Co.*, 50 Church St., N. Y. 7. These furnaces may be gas or oil-fired or electrically heated. Range of heating for gas or electric types is between 600° and 1800° F, oil-burning type 1200° to 1800° F, for such oper-

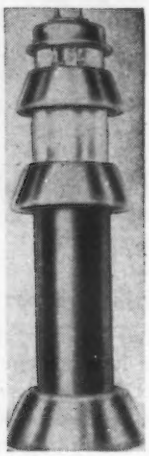
ations as annealing, bluing, carburizing, hardening, normalizing, drawing and stress relieving. In gas-fired furnaces, automatic proportioning equipment is used for single valve control, with Rockwell multi-port alloy steel tunnel burners, firing from both sides of the furnace. In oil-fired furnaces, Rockwell oil burners, which may be manually or automatically controlled,



permit a wide turndown range to assure minimum fuel consumption and temperature variations at the desired operating temperature. In electric furnaces, nichrome wire resistors are suspended from the arch and mounted under the hearth. These individual type heating elements are easily removable, without disturbing the remaining elements.

High Frequency Tube

A HIGH frequency tube has been announced by *Federal Telephone & Radio Corp.*, Newark, N. J., and is especially useful in high power, high frequency broadcasting, FM broadcasting and industrial heating appli-



cations. This tube incorporates a low inductance grid lead, with very complete shielding between filament and plate, and has three electrodes, and an available thermionic emission of 120 amp. Specifications for the tube set the power output at 200 kw per tube when operated as an oscillator or in class C telegraphy, with a plate voltage of 18 kw and a plate dissipation of 150 kw. In operation as a class C plate modulated amplifier the carrier power output is set at 100 kw per tube with a plate voltage of 12.5 kv, the peak instantaneous power output at full modulation being 400 kw per tube.

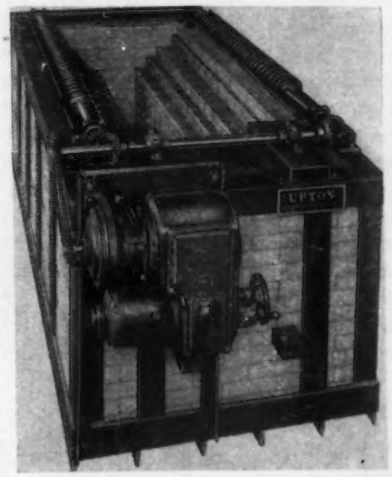
Induction Heater

INDUCTION heaters of a new design have been announced by *Ajax-Electrothermic Corp.*, Ajax Park, Trenton 5, N. J., and are said to speed the heating of bars or tubes for forging, upsetting or spinning in seconds instead of hours. These heaters are mounted vertically on a compact control cubicle. The part to be heated is held in a fast-loading holding cup and is thrust up into the heating coil by a pneumatic ram. Power is then applied, and is automatically cut off when the exact temperature is

reached. The pneumatic ram then lowers the heated piece, which rolls to the forging machine on conveyors. Speed is one piece per minute for each heater, with 250 kw motor-generator power source. Controls are simple to operate, and automatically timed to the split second. Practically any differential heating pattern can be achieved by proper coil design. Scale is negligible, resulting in longer die life and less die cleaning.

Salt Bath Furnace

A HIGH production speed salt bath furnace designed for production quenching and suited for austempering high carbon and other steels has been added to its line of electric salt bath furnaces by *Upton Electric Furnace Div.*, 7450 Melville Ave., Detroit. This furnace is designed for a capacity of 1,000 lb of work per hr at 700° F. The rapidity of quenching which permits this high-speed operation is due, it is claimed, to two factors, the step-back design and the method of adding balancing heat. The step-back



construction is said to give sufficient surface area to radiate and thus dissipate heat at a rate in excess of that brought into the furnace by heated work that is to be quenched. In addition to full automatic operation, including temperature control and timing, the salt that coats the work provides protection against oxidation during the short interval the work is being transferred from high heat to quench.

Butterfly Valves

DEVELOPMENT of double louver butterfly valves for use in blast furnace gas mains where dirty or abrasive gas is present has been announced by *S. P. Kinney Engineers*, Pittsburgh. This valve can be used to control the flow of gas in mains to washers, boilers or bleeder mains. The

double louvers may be ground for very close clearance to give a complete gas shutoff or clearance may be provided as desired. Constructed of 12 pct manganese, the louvers and filler pieces of these valves resist abrasive materials in the gas, and prevent, through streamlining the flow, the impinging of dust particles on the sides.

Planning something . . . ?

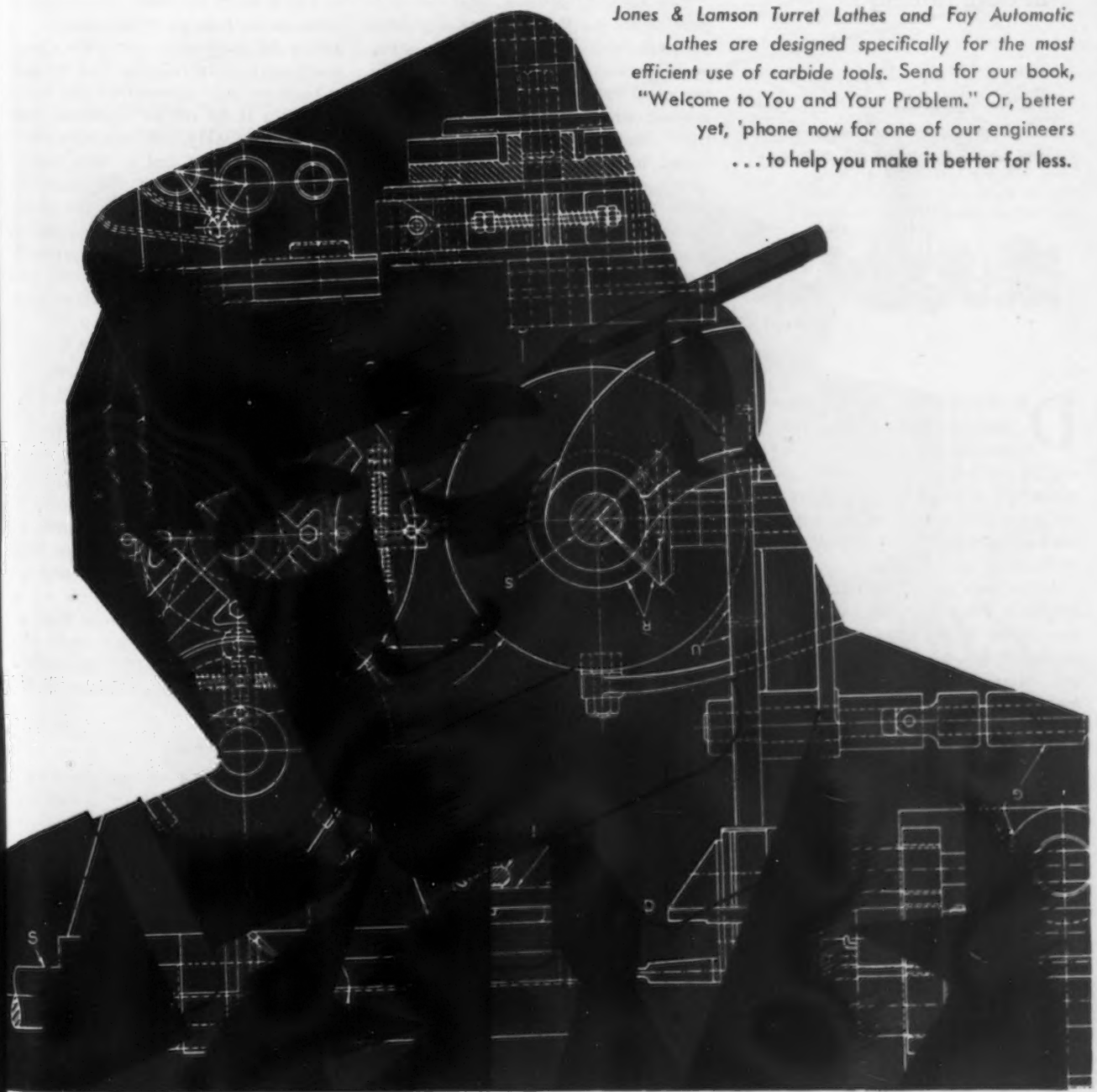
We can help you make it Better for Less

Competition will be intense in the days to come. Profits will depend upon Low Cost Production with the most efficient machines and methods.

Now is the time to scrap your old equipment and replace it with either War Surplus Machines or new machines that can transmit the power and that have the rigidity to use carbide cutting tools at their maximum efficiency.

For these cutting tools provide the fastest known method of metal turning today, increasing cutting speeds from 200 to 500 per cent.

Jones & Lamson Turret Lathes and Fay Automatic Lathes are designed specifically for the most efficient use of carbide tools. Send for our book, "Welcome to You and Your Problem." Or, better yet, 'phone now for one of our engineers . . . to help you make it better for less.



JONES & LAMSON
MACHINE COMPANY
Springfield, Vermont, U.S.A.

Manufacturer of: Universal Turret Lathes • Fay Automatic Lathes • Automatic Double-End Milling and Centering Machines • Automatic Thread Grinders • Optical Comparators • Automatic Opening Threading Dies and Chasers.

Assembly Line . . .

STANLEY H. BRAMS

• General Motors is on threshhold of a major strike, with the union rejecting any advances in pay conditioned by possible increases in prices . . . OPA is plagued by all factors in auto pricing.

DETROIT—The labor skies in General Motors are steadily darkening. Indeed, it would not be too surprising to see a strike spreading through the corporation by the time this reaches print, although the odds are definitely against such a probability at this time.

As matters stand, the parties are in deadlock. The CIO United Auto Workers Union is not only standing firm on its 30 pct wage demand, but also has added the proviso that no raise may be used as evidence with which to go to OPA in seeking a price increase on products. General Motors has offered to balance the increased cost of living by raises in all wage classifications which have not kept pace with this advance—estimated at 30 pct—between January, 1941 and September, 1945; but has refused to concede that such price advances will not be used before OPA, as permitted in Executive Order No. 9651, President Truman's ruling amending Executive Order No. 9599.

The union demand that no price increases grow out of wage advances is to be regarded as a bargaining point rather than a genuine issue. However, it adds fuel to the fire which is already simmering in the rank-and-file, and leads to belief that UAW vice-president Walter P. Reuther is priming his people for a strike. As has been said many times before, the state of mind in the factories is such that an unauthorized outbreak, as for instance in a highly charged center like Flint, could quickly spread and erupt into a full-scale walkout.

The General Motors brief in support of its position is a capably done document and one that deserves study by American industry generally, on the grounds that it take up the cudgel against what it terms "pseudo-scientific" findings that wages can be raised in substantial amount without corresponding increases in product prices. All such studies, claims the General Motors brief, are predicated on the erroneous belief that purchasing power is the basis of prosperity, whereas production actually is.

Not the least interesting feature of this position is a column-by-column set of financial figures, comparing the UAW findings in specific categories with those of the company. The aim is to disprove the union thesis that wages can be raised 30 pct in 1946 while profits are still maintained. Against the union conclusion that a net profit of $432 million would result before taxes, the General Motors statisticians demonstrate that the company would actually lose $150 million.

BECAUSE General Motors reiterated its position that product costs and prices have no place in the current discussion, the auto union has filed charges of unfair labor practices against the company. The unique basis of this complaint was claim that when an employer maintains inability to pay a wage advance, the burden of proof is on him to establish such inability by producing cost data. Inasmuch as General Motors has refused to produce this information, the union considers it an unfair collective bargainer. Probably this complaint will not get very far, but it does accomplish two objectives of the union—to maintain its position on the front pages while moving in aggressive manner, and also to build a groundwork of claim that every avenue was attempted before strike action took place.

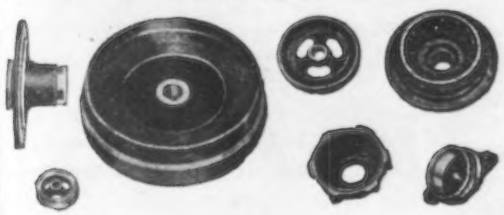
Not alone are direct strikes a headache to the automobile companies. The indirect ones can sometimes be even more far-reaching, as witness the walkouts in plants of Libby-Owens-Ford Glass Co. and Pittsburgh Plate Glass Co., both currently continuing after starting in October. There is some question whether the furnaces banked in these plants can be held alive very much longer, and if they go out estimates are that close to a month will be required before finished glass begins again to come down the rollways. These strikes, accordingly have in them the potential of ty-

BACK TO THE FARM: *Ford-Ferguson tractors being loaded on driveaways for delivery to U. S. farmers.*

HOW A BULLARD MULT-AU-MATIC FITS POSTWAR PLANNING

Bullard Mult-Au-Matics over a period of years have been tooled for thousands of different types of work, some of which are shown in the illustrations. Many installations previously on peacetime products were quickly converted at low cost to meet the requirements of wartime production.

Looking now towards reconversion to peacetime needs, prewar or wartime machines will require retooling, and Bullard engineers stand ready to figure your costs for maximum production and efficiency on your postwar jobs. Well-balanced operations and tooling effect a higher degree of



Mult-Au-Matic efficiency. Bullard engineers are well versed in this technique and their services are your logical choice.

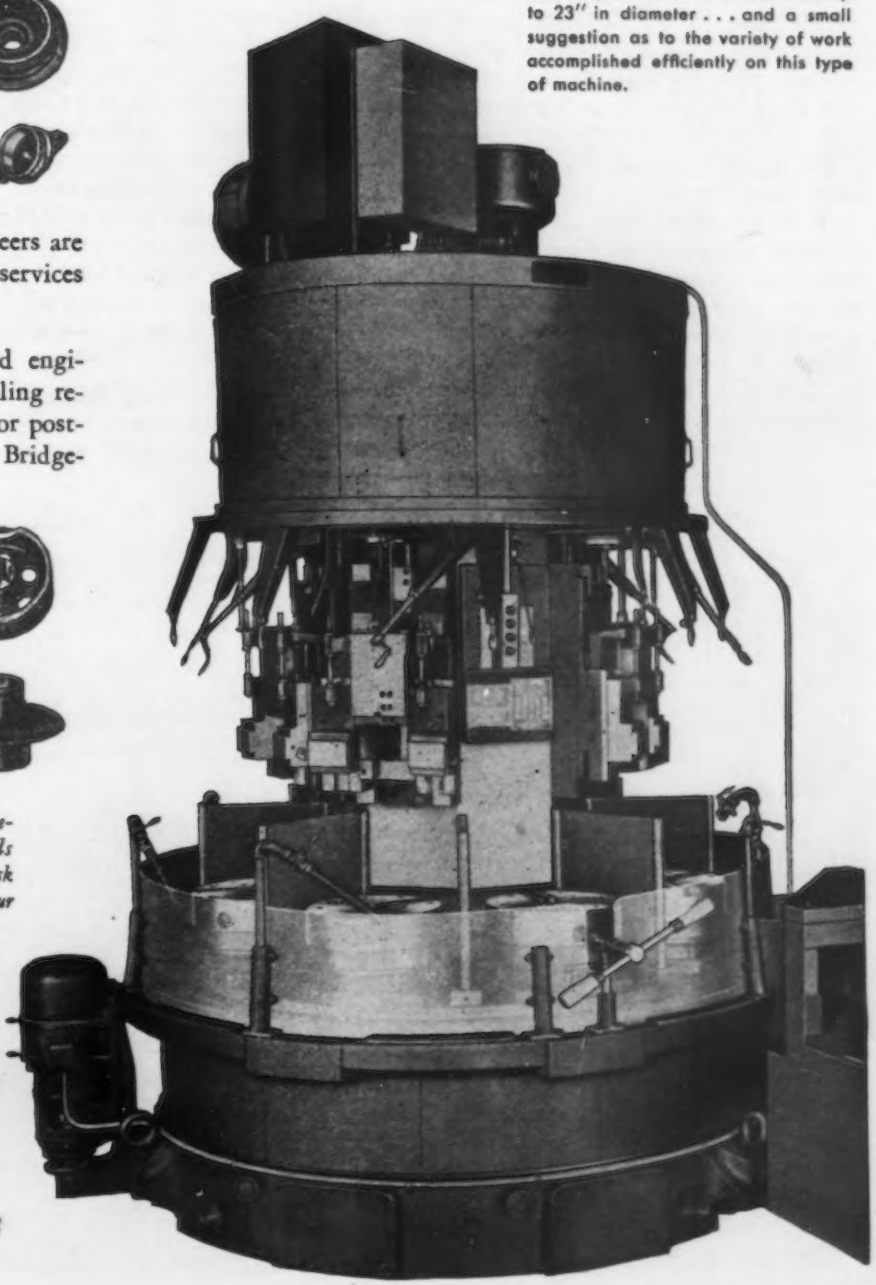
Send blueprints or samples for Bullard engineering time and cost estimates on tooling reconversion. Prepare now and be ready for postwar competition. The Bullard Company, Bridgeport 2, Connecticut.

From Government Machine Tool Surplus Lists select the better machines to replace obsolete models you've been using on non-critical operations. Ask Bullard by serial number for information on your selections.

BULLARD

CREATES *NEW METHODS*

Bullard Type "D" Mult-Au-Matics with 6 or 8 spindles in 4 sizes for work up to 23" in diameter . . . and a small suggestion as to the variety of work accomplished efficiently on this type of machine.



ing up automobile output in a really big way.

Similarly, The Warner Gear Div. of Borg-Warner Corp. at Muncie, Ind., has been on strike through autumn, and has tied up Studebaker and Willys as a result. Strenuous efforts are being made by UAW officials to halt this unauthorized walkout, but no great success has been evidenced so far.

Such continual, though scattered, threats to production come at a time when output is just beginning to climb importantly. Most companies seem to have passed through the pilot plant stage, and their volume is now showing notable week-by-week advances. Chevrolet, Pontiac, Olds and Buick are all producing in the thousands of passenger cars per week, rather than in the hundreds which characterized October. Plymouth is probably in this classification also, and Ford has been for a few weeks. The same goes for Hudson and Nash.

The matter of automobile pricing is very much in the news these days, with OPA in the unenviable position of being pummeled most heartily by labor and automobile dealers, as well as the auto manufacturers themselves. The dealers, probably one of the most effective lobbies in Washington despite the fact that their actual political influence is infinitesimal, are corralling Congressmen into backing up their demand that they bear none of the absorption of increased costs. Why the dealers should have a preferred position of this sort is one of the riddles of automobile wonderland, but nevertheless they are mightily engaged in reaching it. At the same time, the auto union threatens to enjoin OPA from permitting higher than 1942 prices. Pity Mr. Bowles! If his shoulders are not broad now, they certainly will be under the weight of his troubles.

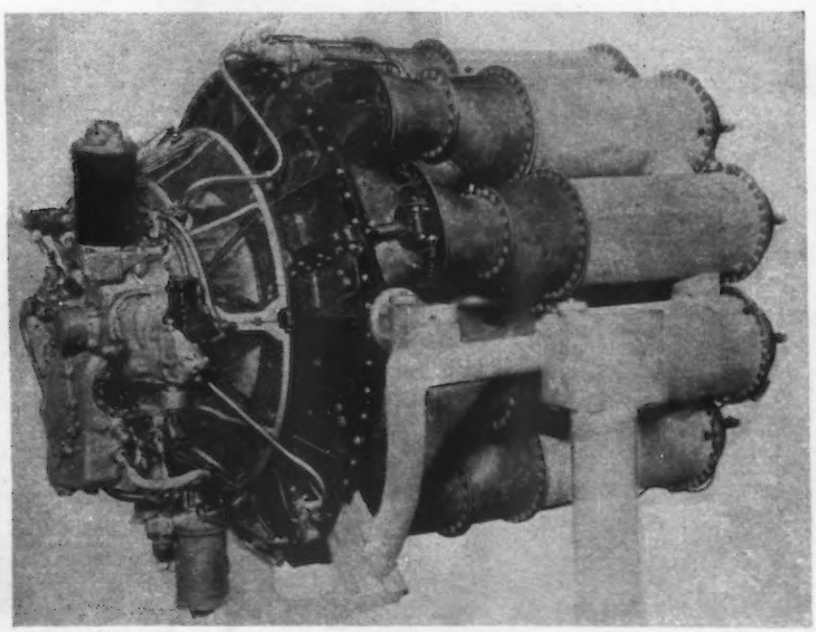
STUDEBAKER, Ford and Packard have submitted price data which have been studied by OPA; Hudson has also submitted, but its report is incomplete. No word has yet come out of General Motors and Chrysler, where the attitude is that the cost compilations required by OPA are so involved that an exact job is impossible. Certainly it is a complicated problem in an organization like General Motors, whose car divisions buy considerable of their requirements from other divisions, all of them faced by pay-raise demands. It is a fact throughout the entire industry, for that matter, that no supplier today is quoting for more than a month's delivery, and many are on a week-to-week basis.

At Dearborn, meanwhile, Mercury automobile production began. Distribution will be well advanced within the next 30 days, and some deliveries before Christmas are indicated. Production will begin soon at the Chicago and Edgewater plants, with daily output expected to reach 150 by the end of November.

On the exterior, the new Mercury, built on 118 in. wheelbase, features a new front grille and wider hood, giving the car a heavier and lower appearance. Mechanical improvements in the engine include tri-alloy bearings, crankcase ventilation, oil filter air cleaner and oil cleaner as standard equipment, improved oil pump, four ring aluminum pistons, interchangeable cylinder heads, and others.

Postwar expansion plans for the Mercury division call for establishment of an exclusive dealer organization as well as separation of production facilities. New assembly points for Mercury will include the three plants of the Lincoln division—the Detroit Lincoln plant and the two new Lincoln plants to be built on the East and West Coasts.

WELLAND JET ENGINE: *The First Rolls-Royce development of the jet propulsion Whittle engine, which fitted in the Gloucester Meteor—the plane that shattered the world speed record recently averaging 606 mph, better than a mile each six seconds.*



Curtiss-Wright Lays Off Buffalo Workers

Buffalo

• • • The Curtiss-Wright Corp.'s Airplane Div. has announced plans to lay off 500 employees at its Buffalo plant immediately and another 3000 sometime in December following cancellation by Eastern Air Lines of a contract for 10 Curtiss transport planes of the CW-20E type. There are more than 5000 on the payroll at the plant.

The company expects to wind up all activity in this area by the end of the year, with the exception of research and war contract termination work. About 2500 are working on terminations, which may extend into next year.

Curtiss is moving all of its local operations except research to Columbus, Ohio. The shutdown here had been previously scheduled for the middle of 1946, but with the cancellation of the only civilian business on the division's books, the picture was changed.

The cancellation was attributed to the government's policy of disposing of surplus military transport planes to the airlines, which made the equipment almost immediately available for use.

How to speed thread inspection . . .

Bryant Thread Gages

☆ This new Bryant Thread Gage Catalog describes all the advantages of these unusual gages . . . it tells how you can inspect internally and externally threaded parts four or five times faster . . . it tells how threaded parts can be inspected all over in a matter of seconds . . . it describes and illustrates three standard and one special model for work from 3/8" to 8" internal and 3/16" to 8" external. A free copy is yours for the asking!

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Please send me Catalog No. G3 which gives complete details on the Bryant Thread Gages

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COMPANY_____

STREET_____

CITY_____ STATE_____

Washington . . . .

L. W. MOFFETT

• NLRB turns down Republic Steel Corp.'s request to dismiss strike vote petition . . . History of WPB to be written . . . Foreign travel difficult at this time.

WASHINGTON—Request of the Republic Steel Corp. that the National Labor Relations Board dismiss the petition of the United Steel Workers of America for a strike vote scheduled for Nov. 28, because the union would thereby renounce the no-strike provisions of its contract, was the first such proposal ever submitted to that body. The strike vote was demanded by the union because of the company's refusal to meet the union's demand for a $2 a day pay increase.

Republic maintained that Congress never intended the strike vote provisions of the War Labor Disputes Act to apply in a case involving breach of a no strike pledge. At NLRB, however, it was said that there is no authority contained in the act which would permit the board at its discretion to dismiss an otherwise valid petition on those grounds.

The authority of NLRB, it was pointed out, is clearly spelled out so as to authorize it to conduct the vote after a period of 30 days from the filing of the petition and, also, to report the results of the vote as prescribed by the act.

Republic's contract with the steelworkers which continues in effect until Oct. 15, 1946, provides as follows:

"During the term of this agreement, neither the union nor any employee individually or collectively shall cause or take part in any strike or other interruption or any impeding of production at any plant of the corporation covered by this agreement."

In return for the above no-strike clause, and for the purpose of enabling the union to make that clause effective, the union was granted maintenance of membership and the check-off of union dues. In its request, Republic charged that by seeking to enlist the facilities of NLRB, the union endeavored to dupe the public by making it appear as though the government may be approving a strike which would be a deliberate violation of the union's contract.

According to a CIO spokesman, the union is opening up the contract which did not include the wage question as an arbitrable issue. This it was said is a strange point in the eyes of management. Such a view is held to be a thorough distortion of a contract that needs only to be applied at will to reduce a contract to a mere scrap of paper.

In replying to Republic's request for dismissal of the petition, Chairman Paul M. Herzog of NLRB said that the Board interprets the language of the War Labor Disputes Act as imposing upon the Board a mandatory obligation to conduct a strike vote in every case in which a notice fully complying with the provisions of the statute is filed. Upon the filing of such a notice, Mr. Herzog said, the Board is without discretion to determine whether or not to conduct a strike vote, irrespective of whether the strike is in violation of any agreement or law.

Mr. Herzog pointed out that Section 8 of the Act specifically provides, without limitation or exception, that on the 30th day after notice by representatives of the employees the Board shall forthwith take a secret ballot of the employees.

Mr. Herzog said that the Board would much prefer not to take any action which might encourage strikes in violation of collective bargaining agreements.

"We are hopeful," said Mr. Herzog, "that the Republic Steel Corporation, fully cognizant of our obligations under the War Labor Disputes Act, will cooperate with the Board and extend every assistance to our agents in the performance of these statutory obligations."

* * *

BY order of President Truman, a history is going to be written of the War Production Board and its predecessors, the Office of Production Management, the Supplies and Allocations Board and the National Defense Advisory Commission. The work will be done under the direction of a WPB Historian and an Advisory Committee, designated by former WPB Chairman J. A. Krug. The Advisory Committee consists of 42 former officials of OPM and WPB and other former officials have been invited to join the council. Dr. James W. Fesler, who was Chief of WPB's Policy Analysis and Records Branch, was named historian. Dr. Fesler is professor of political science at the University of North Carolina.

Both failures and successes should be analyzed, the President indicated, in order to aid the development of government administration. Mr. Krug emphasized that only an objective approach could make the Board's history useful for the improvement of public administration and for guidance in any future national emergency involving economic mobilization.

Into the history, it is assumed, will be written material taken from several reports by what was known as the Truman Senate Committee, headed by the man who ordered that the history be written. On the whole, the Senate Committee had good words for WPB. Only infrequently were the reports salted with criticism of WPB and it was rather mild criticism.

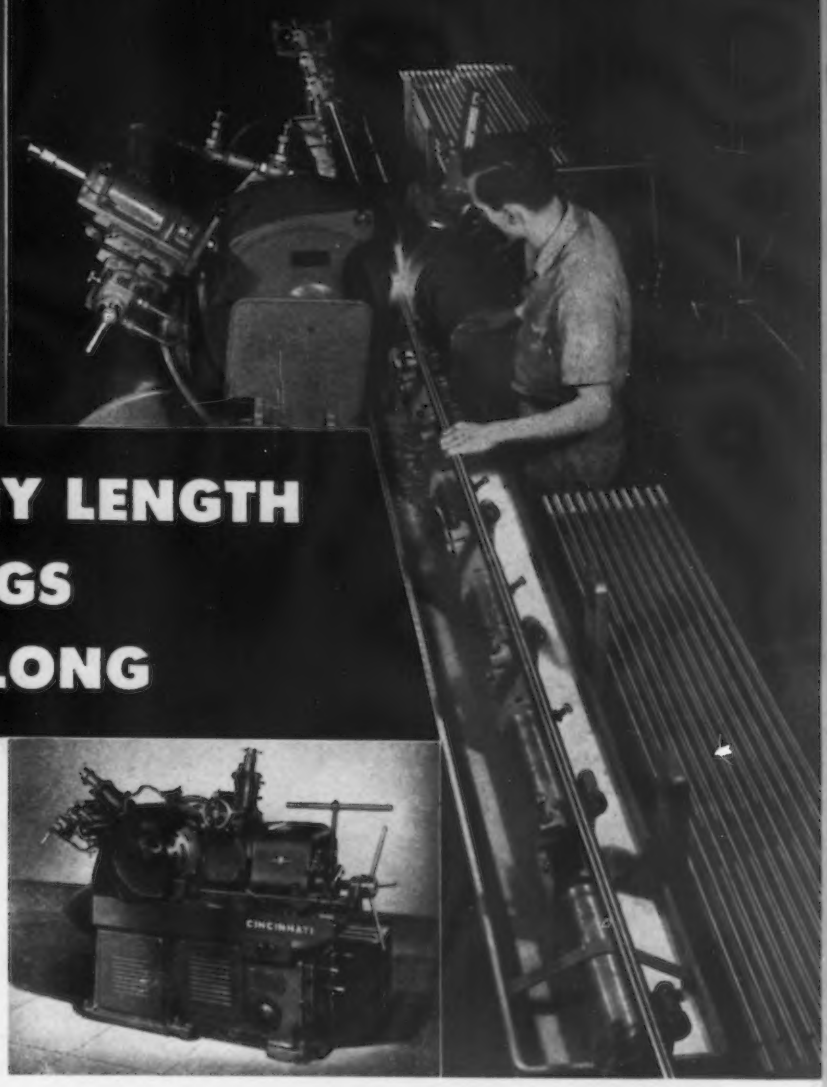
Already comprehensive reports of the work of WPB's various divisions have been issued and no doubt will constitute an important part of the history itself with its outline on the inception of the agencies, their policies and evolution that led into the greatest task of all time in allocating and producing fantastic quantities of materials for the United States and Allied Nations that smothered Germany and Japan in overwhelming defeat.

* * *

Although military restrictions on civilian travel abroad have been relaxed, the time is not yet ripe for

OHIO

ht sizes of fiber rings, 1" to 4¾" diameter, d ¾" thick are Thru-Feed ground on a NCINNATI No. 2 Centerless, using inter-ngeable arbers. Production, 2500 per r.



'OU CAN GRIND ANY LENGTH FROM THIN RINGS TO BARS 18 FEET LONG

on a Cincinnati Centerless!

Small illustration above: CINCINNATI No. 2 Centerless Grinder. Catalog G-456-2, containing complete specifications, will be sent on request. Sweet's Catalog File for Mechanical Industries gives a brief description. Large illustration: A CINCINNATI No. 2 Centerless equipped with Type C Long Bar Attachment for grinding bars up to 18 feet long.

ren the extremes of fiber rings and steel 18 feet long, CINCINNATI Centerless lers handle an unusually wide variety of in these three classifications:

1. **THRU-FEED**—Straight parts from discs and rings up to bars 18 feet long, and diameter ranges from hypodermic needles to 6" bearing races, depending upon equipment selected.

2. **INFEED**—Straight parts up to width of the wheel; long parts, ground on one end (roller infeed method); spherical; out-of-balance; curved shapes, such as bathtub fixtures, depending upon equipment selected.

3. **END FEED**—Taper work.

Parts made of virtually all materials are ground successfully on the CINCINNATI Centerless—ferrous and nonferrous metals, glass, hard rubber, plastics, cork, porcelain and other nonmetallic substances.

Perhaps the low-cost centerless method could be adapted to more of your cylindrical finishing operations. Why not talk it over with the Cincinnati Engineers? For many years they have been developing new applications for centerless and centertype grinding, and will be glad to give you the benefit of their knowledge and long experience.

CINCINNATI GRINDERS INCORPORATED

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CINCINNATI

ER TYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES • CENTERLESS LAPPING MACHINES

American businessmen to venture abroad except where absolutely essential.

Civilians need now secure military permits for trips only through Germany, the main islands of Japan, Formosa and Korea. However, permission must still be secured from the Supreme Allied Commander, Southeast Asia, through the State Dept., for civilian travel in the area under his jurisdiction. This includes Burma, Thailand, Malaya, Sumatra, Java, Borneo, New Guinea and the Solomon Islands.

THE situation with regard to living conditions and transportation continues to prevail in areas formerly under military control as well as in other European and Asiatic areas. Furthermore, the State Dept. emphasizes, transportation to the United States is difficult to obtain in most instances due to troop movements. Civilian travelers may expect a delay of from six months to a year in returning to the United States.

Since the presence of representatives of American firms is recognized as necessary for the early restoration of trade, the State Dept. has been issuing passports since VJ-Day. Businessmen desiring to travel in China may now secure visas through the State Dept. from Chinese consulates in this country without reference to Chungking as heretofore.

Regular steamship service with the Far East has been resumed and private shipments are now being accepted. Air transportation, now confined to service by way of India, will soon be available across the Pacific. The War Dept. has agreed wherever possible to have food, quarters and local transportation furnished American businessmen when such accommodations are not obtainable in the usual way.

Communications have been re-established with principal cities on a commercial basis and efforts are being made to bring about resumption of banking services in that area.

The State Dept. recently announced a more liberal policy, with respect to the granting of military permits for travel in Italy, will permit acceptance of passport applications on behalf of commercial business when it can be shown that it is in the national interest of the United States and Italy or will aid materially in the economic rehabilitation of Italy. The Treasury Dept. no longer requires licenses for persons going from the United States to Italy to effect business transactions or to enter into business relations, provided, however, that no arrangements are made for the transfer or other disposition of blocked property in the United States.

Nazi Fuel Secrets To Be Distributed To U. S. Industry

Washington

• • • Secrets of Nazi research on solid and liquid fuels which have been uncovered in Germany and removed by Allied civilian investigators will be analyzed and distributed to American industry as rapidly as possible, according to information from the Bureau of Mines.

Secretary Ickes states that already many of the German documents have been microfilmed and distributed, and that a number of reports of the American investigators have been made available to industry and educational institutions.

To facilitate this service, a special section has been established within the Bureau, by Dr. R. R. Sayers, to coordinate the compilation of the foreign technical data and to prepare them in form for use by industry and science.

"In addition to research data, patents, engineering reports and other documents," Dr. Sayers stated, "Bureau technicians and other investigators have collected samples of apparatus, machinery, plant equipment, catalysts and end products of manufacture from German laboratories and plants.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

BR-R-R! THEM FOOLS, COMIN' OUTA THAT OVEN SWEATIN' AN' HALF NAKED INTO THIS CHILL AIR! YE GODS--AIN'T THEY AFRAID OF PNEUMONIA?
WHY, YOU GOT IT RIGHT NOW-- I MEAN YOU MIGHT AS WELL HAVE IT!
IT HAD ME SCAIRT STIFF FER THIRTY YEARS--THEN I GOT IT-- THEN I WISHED I'D HAD IT FER THIRTY YEARS!
SUFFERING HUMANITY
11-16
J.R.WILLIAMS
COPR. 1945 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.

No Scrap Overseas Except Army Stores

Washington

• • • No particularly large tonnages of prepared or unprepared scrap at Army depots in the European and Mediterranean theaters of war were found by the Overseas Scrap Advisory Committee of the War Department which recently returned from an extensive tour of these theaters.

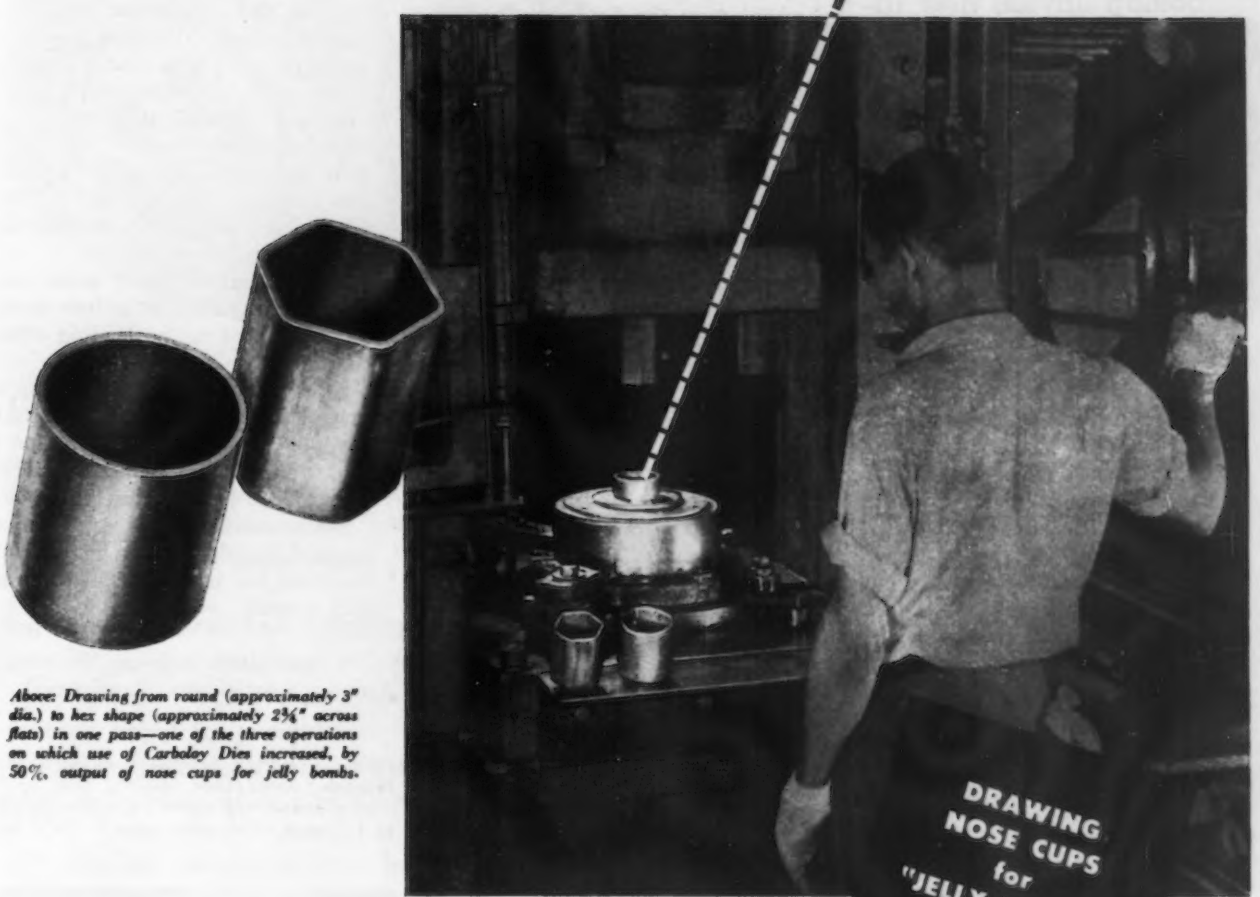
A member of the committee pointed out, however, that there is a large potential source of scrap in surplus equipment and ammunition of which there are huge stores. It was pointed out that if these sources are developed into scrap there will be huge supplies.

The policy determining what disposition will be made of surplus equipment and ammunition such as tanks, jeeps, trucks, guns, etc., rests with the War Department.

Nonferrous

A Quick Change Here

STEPPED PRODUCTION UP 50%



Above: Drawing from round (approximately 3" dia.) to hex shape (approximately 2¾" across flats) in one pass—one of the three operations on which use of Carboloy Dies increased, by 50%, output of nose cups for jelly bombs.

★ In the drawing of nose cups for jelly bombs, at C. M. Hall Lamp Company, Detroit, the production line "snagged" at these three vital points (1) "ironing" the walls from .140" to .125" thickness, (2) drawing from round to hex in one pass, (3) final sizing. Extremely rapid wear on chrome plated dies required frequent press down-time, at intervals ranging from a few hours to 3-4 days. A special crew of die service men worked continuously on die replacements.

To relieve these "bottlenecks", Hall made a quick change to Carboloy Sheet Metal Dies, replacing the chrome dies with one standard R-18 round Carboloy Die, two special hex's.

The result: Production of nose cups increased at least 50%. Die servicing time reduced more than 95%. Die cost substantially lowered. Die life increased to as much as 250,000 pieces per die to date, with all Carboloy Dies still operating on size.

Such outstanding results from the use of Carboloy Sheet Metal Dies on parts for war, point the way to unusual advantages in the production of better products at less cost, for competitive postwar markets.

Can our Carboloy Die Specialists help you on peacetime planning and production?

CEMENTED CARBOLOY TRADEMARK SHEET METAL DRAWING DIES

CARBOLOY COMPANY, INC.

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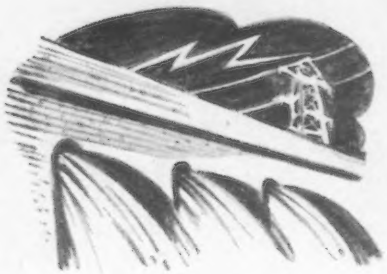
Chicago • Cleveland • Detroit • Houston • Los Angeles
Milwaukee • Newark • Philadelphia • Pittsburgh
Thomaston

West Coast . . .

OSGOOD MURDOCK

• Oregon Steel Mills land $2 million cash order for 30,000 tons of bars to French and Russian Governments . . . Boeing unveils new triple-threat plane . . . Fifteen cent raise to structural iron workers.



PORTLAND—Oregon Steel Mills have signed a $2 million contract for 30,000 tons of steel bars to the Russian and French Governments in what is said to be the first cash steel sale to a foreign government since the termination of the Lend-Lease Act. Rolled to SAE and ASTM carbon steel specification, about $500,000 worth will be used in building trucks and equipment in the two countries and the rest will go into the construction of railways, buildings and bridges.

Production of the material will take half of Hesse-Ersted's capacity for a period of five months and will involve a payroll of some 200 employees, according to A. M. Mears, president and general manager of the mills. In order to complete the contract Hesse-Ersted will buy additional ingots from the Isaacson Iron Works, Seattle.

Negotiations with the Russian Government were conducted by Linwood McCord, sales manager of Oregon Steel Mills, prior to consummation of the $400 million loan from the United States to the Russian Government which is expected to reopen the flow of shipping from this city, the principal lend-lease port during the war, to Russia. The steel is to be carried on Russian bottoms to Vladivostok. The Russian sale was made through the Soviet's Purchasing Commission in the United States, and details will be handled by the Commercial Dispatching Co.

The French sale was made to the French Government and the French Colonial Mission. Part of this order is bound for Indo-China. This shipment will accompany lumber and wheat from the Columbia River area on French merchant vessels while the Indonesian steel will be shipped from Los Angeles.

Oregon Steel Mills also plans to enlarge its facilities with a 50 x 150 ft. warehouse with a central overhead craneway.

* * *

SEATTLE—Another new Boeing plane, hitherto secret but about ready for unveiling and labeled XF8B-1, is a Navy fighter. Conceived primarily as a long-range carrier fighter it differs from most shipboard planes in that it is equipped with an internal bomb-bay and is adaptable to service as a torpedo plane. It is powered by a Pratt-Whitney R-4360 Wasp Major engine with a military and take-off rating of 3000 hp and a war emergency rating of 3600 hp. It has water-injection driven, three-bladed, torque-free, dual-rotation props 13 ft 6 in. diam.

As a fighter the plane has a top speed at 25,000 ft in excess of 425 mph with military power, and in excess of 450 mph with war emergency power. Rate of climb is nearly 5000 ft a min.

The XF8B-1 incorporate several other unusual features designed to increase its value in its triple-threat role of fighter, fighter bomber and torpedo plane. The wing is of a solid monospar type with a very thick skin, which provides aerodynamic smoothness and torsional stiffness to insure effective aileron control. All landing gear, tail included, is fully retractable. The cockpit is roomy with a bubble-type canopy designed to provide maximum vision.

The fighter will carry either six 20 mm cannons or six 50 caliber machine guns mounted in the leading edge of the wing.

As a bomber the big little ship will carry up to 3000 lb of bombs in the bomb-bay. Possible combinations include four 500 lb bombs, two 1000 lb or two 1600 lb armor piercing bombs.

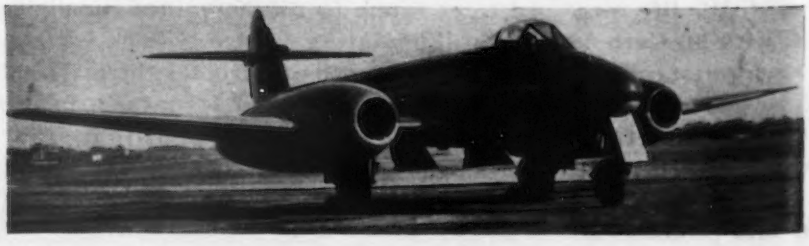
No contract orders have been announced by Boeing as yet although the plane has been test flown for several months.

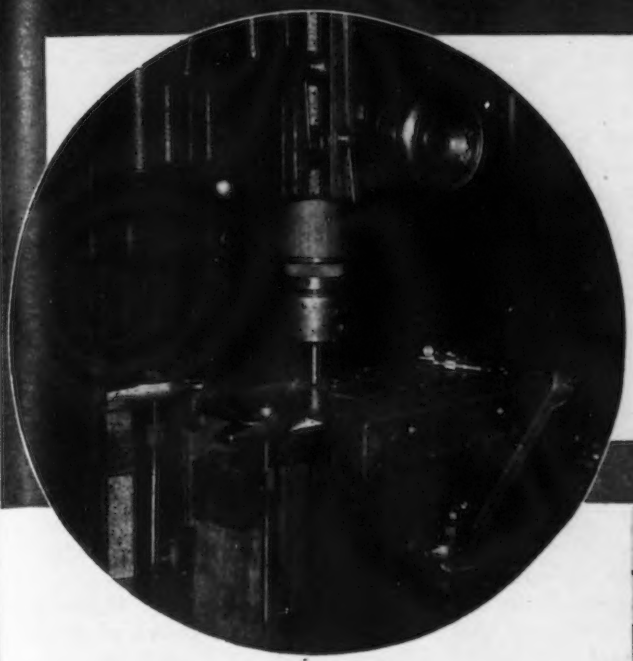
* * *

A new little industry has cropped up in Seattle—the Metal Craft Co.,

PRIVATE FLYING: *The "Ensign," produced by All American Aircraft, Inc., Long Beach, Calif., is an all-metal, low-wing monoplane powered with an 85 hp Continental engine which gives, it is claimed, top speed in excess of 125 mph and a practical cruising speed of 112 mph. The wing span is 33 ft and fuselage overall length 22 ft.*

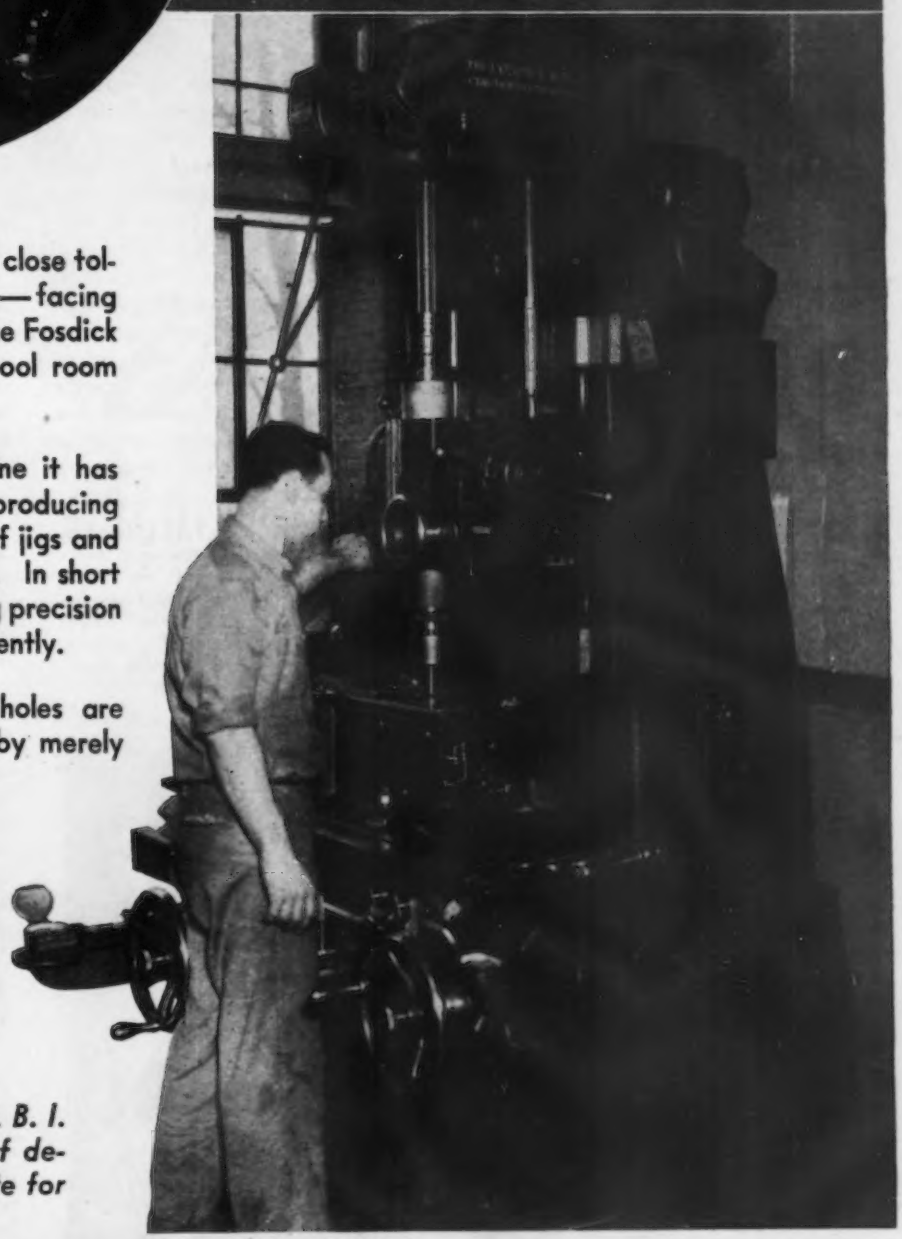
WORLD'S FASTEST: *The Gloucester Meteor, jet propelled plane built by Gloucester Aircraft Co., undergoes a final tune up at Manston Aerodrome, England. The plane piloted by RAF Group Capt. Hugh Wilson flew four times a straight course, 100 ft high and 1.86 miles long, hitting 604 mph, 608 mph, 602 mph and 611 mph, which averages 606 mph—new world record.*





MEETS RIGID TOLERANCES
AND MAINTAINS THEM

FOSDICK
JIG BORERS



● Designed and built to meet close tolerances on boring — reaming — facing and light milling operations the Fosdick Jig Borer is ideal for both tool room and tool and die shop work.

For a medium priced machine it has proved most economical in producing small lots on which the cost of jigs and fixtures would be prohibitive. In short it is a "natural" for producing precision work inexpensively and efficiently.

On the job shown several holes are within reach of the spindle by merely moving the table to desired position with the handwheel.

If your work requires precision boring—reaming—facing and similar operations put it on a Fosdick Jig Borer for accuracy and low cost production.

Fosdick Jig Borer Bulletin J. B. I. contains complete details of design and construction. Write for your copy today.

FOSDICK MACHINE TOOL COMPANY
CINCINNATI 23, ··· OHIO

headed by three former Boeing Aircraft employees, C. E. Kammayer, Ben Eastman and Roy Anderson. The firm is using about 40,000 lb of Washington State aluminum per month making Christmas tree stands and other aluminum castings. The management expects to work into a complete line of pots, pans and other cooking ware. At present they are producing about a thousand Christmas tree stands a day for national distribution, using a new permanent-mold casting machine designed by partner Anderson.

At present the plant employs about 18 people and expects to increase this number to 30 by the first of the year.

* * *

LOS ANGELES—Lockheed Aircraft Corp., and 24,000 employees have arrived at an agreement for a 15 pct increase in wages, subject to ratification by the workers. The contract was negotiated with the AFL Machinists Lodge 727 and will be submitted to a vote this week.

Four other southern California airplane plants are also starting negotiations with the CIO United Auto Workers. These plants, negotiating jointly are Douglas at Long Beach and Vernon, North American at Inglewood, Consolidated Vultee at Downey and Ryan Aeronautical at San Diego.

The same four firms and Northrop Aircraft are also opening negotiations with the United Aircraft Welders.

* * *

Electric Household Utilities Co., makers of washing machines and other equipment have purchased a 10-acre site and are going to build a plant with 170,000 sq ft of space. Initial payroll will be between 200 and 250, rising to 1100 on completion of the plant.

* * *

SAN FRANCISCO—As striking unions roil and moil throughout the country, and the local machinist's union ties up a sizeable crosssection of all Bay region industry, the Structural Iron Workers' Local 421 quietly sign a new contract with the steel fabricators for a 15c an hr raise.

Business Agents Anthony Chiappe and Joseph Costa, continuing to earn the respect of the employing members of the industry, sensibly left open possible future negotiations by stipulating that if the agreed increase falls below the level of general wage raises in other branches of industry during the life of the contract, the subject could be reopened.

Original union demands were for a 25c hourly increase, but the union, still driving a hard bargain, also obtained a revision of the vacation clause. Former 1-week for 1-yr vacations have been amended to 2-weeks for 5 yr or more. Still unsettled is the request for double time instead of time-and-a-half for Saturday work, however, it is expected that the union will gain this point too.

This contract is believed to be the first one to be signed with the craft since termination of the war, and is the first for the local since June 1942. The new rate represents a 300 pct increase over the wage paid when Local 491 was originally organized in 1937.

* * *

Steel warehousemen are beginning to see signs of a return to normalcy as local buying trends catch them between the proverbial devil and the deep Pacific. Orders are accumulating at an unwanted rate, as buyers anticipate irresistable forces at work for a new ceiling on many items. Jobbers, seeing eye to eye with buyers, readily discern the advantages of delaying tactics and are accepting orders with what can only be described as a reluctant desire to serve. Forward booking at the mills continues and warehousemen are filling orders out of stock. Even though they are making money, they don't seem to like it.

* * *

LATEST developments in the Kaiser industries include preparation and figuring on the additional equipment to be installed at Fontana under terms of the $11,500,000 RFC loan. Estimates and budgeting must be completed and approved for submittal to RFC, which retards the placing of orders until the first of the year.

Present Fontana plans include shopping for a Fritz Moon pipe mill and facilities for electric welded pipe; extending the range of merchant products; a blooming mill and improvements in the 36 in. plate mill which will eliminate rolling direct from ingots.

Activities of the Kaiser Hillercopter Co. are being transferred to the Fleetwing Div. at Bristol, Pa., coinciding with the resignation and withdrawal of Stanley Hiller, Sr., from the company.

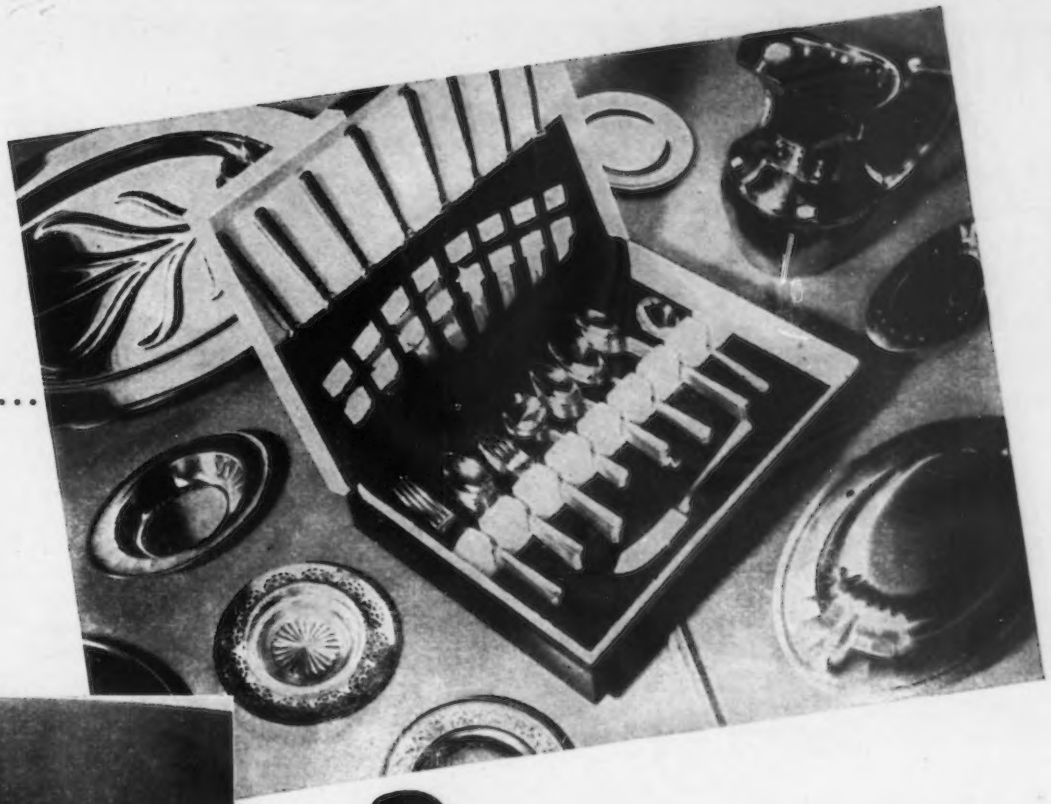
The Kaiser dishwasher, also to be produced at the Fleetwing plant, is just about ready for production, but costs are still above the $100 mark, which company officials feel is too high for mass consumption. The firm's idea men are playing with a plastic model which they believe can be brought down to $25 to $50.

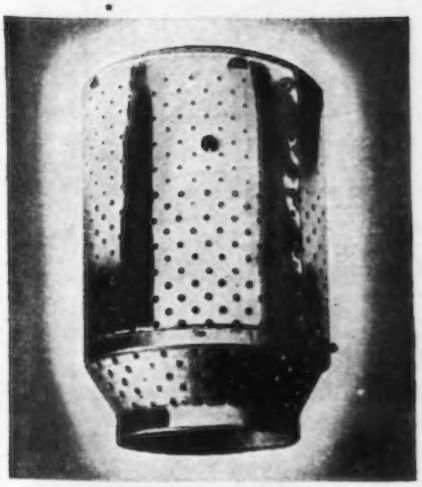
At the same time Mr. Kaiser is reported to be interested in the southern pulp industry. On a recent trip to the East he took the opportunity to inspect pulp producing facilities in the southern states. Motivating factor behind this interest is a freight rate structure for southern pulp similar to that for western steel, affording local regional producers an automatic price umbrella. Recent successes in pulp production from southern timber varieties are impelling Kaiser Engineers to apply the economic formula for Western Steel to southern pulp and paper.

* * *

The California State Toll Bridge Authority has appropriated $40,000 to survey the subject of a second Bay bridge. (IRON AGE, Nov. 1, p. 80). At the same time Woodruff & Sampson, engineering firm retained to study San Francisco's traffic problem, is recommending a Market St. subway and an extensive network of freeways crossing and encircling the city. Both of these latter improvements are bolstered by evident necessity in the form of acute traffic congestion, and have been the subject for informal preparatory studies by several private firms of substantial position.

CIVILIAN WALKIE-TALKIE: *The American-made B-48 two-way wireless set—outgrowth of the B-18 British model—being adapted for civilian purposes by Emerson Radio & Phonograph Corp. The photo shows a Chinese girl learning operation of the walkie-talkie.*





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COLD ROLLED STAINLESS STRIP?

The need for greater serviceability and sales appeal in products of tomorrow underscores the advantages of ARMCO Cold Rolled Stainless Steel Strip.

Before the war, this rustless steel helped make many products look better and last longer. Today more and more designers are putting to profitable use the corrosion resistance, high strength and attractiveness of ARMCO Stainless Steels in many kinds of architectural, commercial, and household products.

Among these products and product-parts for which stainless strip is used are refrigerator evaporators, oil burner sleeves, furnace humidifiers, architectural trim, hospital equipment, cooking ware, flatware, cream separators, metal furniture, and gutters and downspouts.

PROMPT DELIVERY

Armco's mills are rolling to capacity now—making special sheet steels for new beauty, and better service in equipment of all kinds. We can offer you prompt delivery of ARMCO Cold Rolled Stainless Strip in coils or cut lengths.

If your products (or parts of them) are suited to this special steel, get in touch with us. Wire, phone or write the Armco district office nearest you—or The American Rolling Mill Company, 2981 Curtis Street, Middletown, Ohio.

STAINLESS ARMCO STEEL

THE AMERICAN ROLLING MILL COMPANY

Special-Purpose Sheet Steels

European Letter . . .

JACK R. HIGHT

• Housing delays cause British dissatisfaction . . . Steel framework gaining ready acceptance . . . British long-term plan calls for 4 million homes in 10 years.

LONDON—Caught on the horns of an apparently inescapable dilemma, the Labor Government here finds itself vainly trying to put roofs over the heads of every blitzed citizen of Britain this winter while at the same time cautiously laying out a long range housing program that will be a keystone of its plans for improved conditions in the country. Pressure to take care of the emergency problem, and criticism of inability to do so completely are both already widespread.

Of the two problems, it would take a Solomon to arrive at a final conclusion as to which is the most important to Britain today. No one, least of all the new government, wants to see the citizens endure longer than six years of wartime exposure. Yet there probably aren't enough labor and materials available to meet even the most urgent needs before cold weather sets in. And every manhour that is spent in the construction of a frame hut of one room must at some future date be duplicated with additional manhours for more permanent shelter. And the task in London alone is already being reckoned in hundreds of thousands of many-years of work to be done.

What appears to be a logical compromise of three basic types of housing was worked out weeks ago by the Ministries of Works and of Health, but the development headaches that any such huge program inevitably falls heir to are now causing much comment. The overall, long-term housing plan for the British Isles has been a part of the law for many years, and the proper combination of a certain number of emergency type one-room shelters, temporary prefabricated houses to last ten years, and conventional houses for present needs was made a part of that plan as the war ended.

Apparently overoptimistic estimates of how long the advance work on the home sites would take, how much labor would be available in building trades, and how long the prefabrication in the factories would require, as well as underestimating on the costs have all contributed to a present feeling of dissatisfaction that is being voiced in some quarters.

GENERALLY speaking, the emergency hut work is going forward at what is thought to be a satisfactory rate, although the prospect of living in these one-room frame houses is not particularly exciting to most Englishmen. Much preferred by all are the prefabricated types, some of them designated as "temporary" by the Ministry of Works, but still all of them featuring labor saving devices that were unknown in the house of the average worker in prewar Britain.

Unfortunately, however, it is in these special-type housing projects that many of the discouraging notes are being sounded. The aluminum house, which was considered by many experts to be the most promising of the lot especially in view of the superabundant material supply, is going to cost about $5460 instead of the original estimate of $3650. Production is just beginning to get underway and the houses will be used only in the north of England, close to the aircraft plants that are to build them. This is partly because the house is so completely prefabricated into large sections that special cranes are needed to load and unload them, and special hauling equipment to transport them.

Revised estimates of the cost of preparing the sites, clearing bombed areas, of design changes dictated by experience, and for contingencies are also tending to increase the total cost of all designs beyond the original estimates.

Prototypes of most of the houses were completed before the end of 1944 and have had people living in them, so that some actual experience has been gained in their use. Most of the types actually approved for production in the temporary prefabricated

Housing Costs

This 50-ton capacity Lectromelt is one of the largest top charge furnaces in operation in the western hemisphere.

For melting and refining acid and basic steels, alloy steels, gray and white irons, etc.

Rated capacities 100 tons down to 250 pounds in the top charge type, laboratory sizes down to 25 pounds.

Top charge and door charge types

SPECIAL TYPES

For smelting ores and concentrates of iron, copper, nickel, manganese, cobalt, antimony, magnesium, zinc, etc.

For production of ferro-alloys, carbides, phosphorous, refractories, etc.

Literature on request.

MOORE RAPID

Lectromelt

FURNACES

PITTSBURGH LECTROMELT FURNACE Corp.

PITTSBURGH 30, PENNA.

group are now in the stage where they are making a trial production run of 50-100 units, to perfect manufacturing and assembly techniques. The actual large-scale production months for this program will probably be in the first half of 1946. The aluminum house program, with twice as many units ordered as any other single type, is the only one scheduled to run heavily into the last half of 1946.

TO tide over the period immediately after the war, while the labor supply is still short and until conventional housing can be arranged to fulfill the demand, the Ministry of Works has on order 123,000 units of eight approved types. The construction ranges from all metal to poured concrete types, and the variations are planned to utilize as many industries as possible in the emergency period. Thus the electrical appliance firms, steel fabricators, automotive plants and aircraft builders, as well as all branches of the building industry, are participating in the program.

Included are 25,000 "Arcon" houses made of asbestos sheet siding over a steel framework. A large window manufacturer is producing the steel framework, using angle beams for the corners and sidewalls and tube stock for the roof. An eventual production rate of 1800 units per month is hoped for this type. Deliveries before Oct. 1 totaled 2260.

Of a design known here as the "Uni-Seco" type, the Ministry has ordered 20,000 units. This pattern is timber framed, covered inside and out with asbestos sheeting. Greatest progress has been made on this type, with deliveries totaling 7650 to Oct. 1, and a production schedule of 1500 per month planned.

The reinforced concrete industry has introduced a design known as the "Tarran" house, of which 16,000 units have been ordered and 955 delivered. The production goal is 1200 houses a month. In this design reinforced waterproof concrete panels are prefabricated and bolted to reinforced concrete posts at the corners.

Three designs of less importance account for 4800 additional units on order, one an all steel design, another a steel framework pattern.

The aluminum house, arriving at the site in four pieces ready for joining and then needing only finishing touches for completion, is considered to be in a class by itself. It has been given an official legal life of ten years by the Ministry, and each house uses about three tons of various low grade aluminum alloys. The production goal is about 5000 houses a month, to be reached next summer. Only ten have been completed to date.

A wood frame house designed in the United States to be furnished with the assistance of lend-lease was originally the subject of an order for 30,000 houses, but after about 8000 had been completed the lend-lease program was halted and the balance of the order was canceled. Under the original plan $3200 of the cost of each house was to fall on the British Government, while lend-lease took care of $2120, the balance. The addition of the lend-lease houses from America brings the total of houses actually completed to about 21,000.

Added to this urgent program of temporary housing is the burden of 300,000 permanent houses which the Government hopes to have completed within the next two years. If such a program is actually carried out it will mean the construction of approximately twelve times as many houses as were built in the same period after the last war. Plans are to make as full use as possible of prefabrication, although it is not considered feasible nor desirable to standardize on one or two specific types. Many designs are through the prototype stage and are ready for trial scale production development work.

SUFFICIENT sites all over the country for most of the 300,000 houses have been acquired and work on the sites is now getting underway. Delays are serious, however, because most of what remains of England's building trades workmen are laboring day and night at the almost superhuman task of repairing war damage in the London region. When the most pressing of this work is done, a greater force will be applicable to the housing program. There are still 200,000 man-years of work ahead of them, however.

These goals of temporary and permanent housing are directed toward the reduction of an estimated nationwide immediate need for a million homes. Before the war Britain was building approximately 300,000 new houses a year. During the war, with virtually no construction going on, over 200,000 homes have been destroyed outright, 250,000 have been seriously damaged and 4 million slightly damaged. This means that one-third of all the homes in the country have suffered war damage. On top of this, ordinary repairs and maintenance work have been suspended here for six years, so many homes outside the war damage group have fallen into serious disrepair.

Controls are rigid to see that war damage repair is going forward at the present, to reserve other manpower and materials for housing work.

The real long-term plan for British housing is for the construction of four million permanent homes in the next ten years. This need is an accumulated one, dating back to the nineteenth century, when the country first became interested in its housing needs. Studies made compulsory by law since that time have kept up a census of the overcrowded conditions in industrial areas due to the continued trends of population away from rural areas of England. Needed slum clearance projects are also a part of the program, and much of this work will presumably be taken up where it was dropped before the war.

War Plants Selling At Bargain Prices

Ottawa

• • • The Canadian government through War Assets Corp., is speeding up the sale of war plants. War plants are being sold at approximately 50 pct of their original cost, but in practically all instances sales are made to companies that will continue to make use of the plants for civilian production and to give maximum employment. Sales completed to this time include the following:

Aluminum Goods plant on Dundas St., Toronto, to the Canada Triangle Wire & Cable Co., for $80,000.

The Genelco Building, Peterboro, Ont., sold to Canadian General Electric Co., for $1,500,000.

A large plant at Hamilton, Ont., has been sold to Canadian Westinghouse Co., for $700,000.

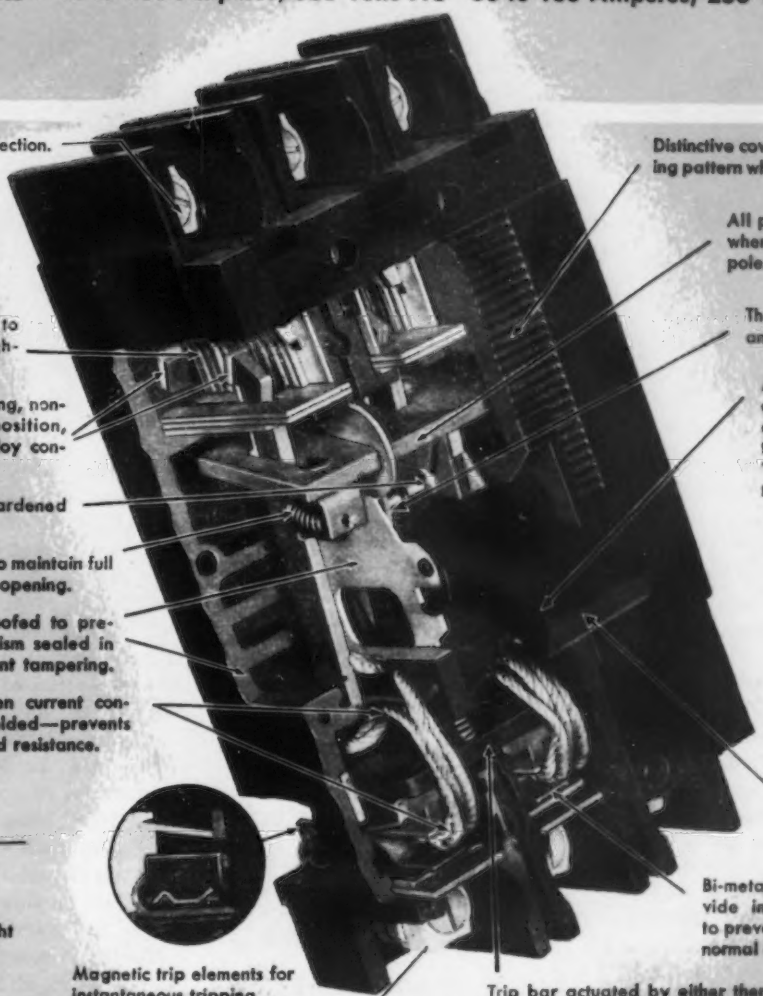
The Dominion Magnesium plant at Haley's Corners, Ont., has been sold to Dominion Magnesium Co., for $1,400,000.

The plant of Canadian Strip Mill Ltd., New Toronto, Ont., has been purchased by Anaconda Copper & Brass Co., for $455,000.

The Valleyfield, Quebec, sulphuric acid plant has been sold to Nichols Chemical Co. Ltd., Montreal, for $700,000.

A New and Improved
100-AMPERE FRAME CIRCUIT BREAKER

Type ML2 • 15 to 100 Amperes, 600 Volts AC—50 to 100 Amperes, 250 Volts AC-DC



Designed for front connection.

Distinctive cover design provides pleasing pattern when breakers are grouped.

All poles trip simultaneously when overload occurs on any pole.

The mechanism is quick-make and quick-break.

Automatic tripping is clearly indicated; handle assumes intermediate position between "ON" and "OFF" when breaker is tripped by overload.

Arc chambers designed to provide effective, high-speed interruption.

Contacts are non-welding, non-oxidizing silver composition, mounted on copper alloy contact arm and terminal.

Bearing surfaces are hardened to reduce wear.

Springs cause contacts to maintain full pressure until instant of opening.

All steel parts rust-proofed to prevent corrosion; mechanism sealed in bakelite case to prevent tampering.

All connections between current connecting parts are welded—prevents loosening and increased resistance.

Strong bakelite handle moves in sealed grooves.

Bi-metal overcurrent elements provide inverse time characteristic to prevent tripping on momentary normal overloads.

Breaker Unit Dimensions

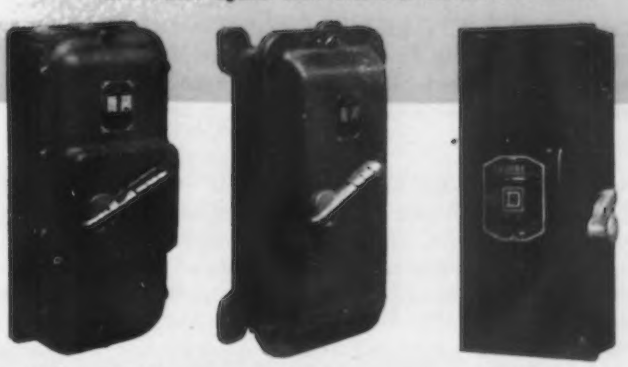
9 9/16" long
4 15/32" wide
3 3/4" high
4 7/8" maximum height including handle

Magnetic trip elements for instantaneous tripping.

Trip bar actuated by either thermal or magnetic trip elements. Mechanism always trip-free, so contact cannot be held closed against short circuits or abnormal overloads.

Solder-Solderless connectors furnished on ratings of 35 to 100 amperes. Screw and eared washer 15-20-25 amperes.

● The new ML2 is furnished in distribution panelboards, as well as the three types of enclosures shown at right. Write for ML2 Bulletin, which gives complete details.



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Explosion Resisting

Dust Resisting

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DETROIT • MILWAUKEE • LOS ANGELES

PERSONALS

MARCUS M. CHAPMAN, manager of sales, Sheet Div., Carnegie-Illinois Steel Corp.

• **Marcus M. Chapman** has been appointed manager of sales, Sheet Div., Carnegie-Illinois Steel Corp., Pittsburgh, succeeding Howard V. Clark, resigned. Mr. Chapman has been associated with U. S. Steel subsidiaries since 1919, first as an openhearth employee and later with the sales dept., serving in St. Louis and Kansas City. He has been assistant to manager of sales in the Pittsburgh general office Sheet Div. since 1939, following a similar position in the Chicago district sales office. He served nearly two years with the Steel Div. of the WPB.

• **Harold E. Bliss** has been appointed assistant secretary and assistant treasurer of Graham-Paige Motors Corp. in charge of the financial dept. at the company subsidiary in Warren, Ohio, the Warren City Mfg. Co.

• **Charles Schenck**, engineer of development, Bethlehem Steel Co., Bethlehem, Pa., has retired. He joined the company in 1918 as production engineer.

• **Herbert D. Rollo** has been appointed New England district sales manager of the Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp. Mr. Rollo has been connected with Wickwire Spencer since 1933 and has been stationed in Chicago and in New York as wire rope sales engineer. He will make his headquarters in Boston.

• **James C. McFee**, formerly assistant sales manager, Mackintosh-Hemphill Co., Pittsburgh, is now associated with Gus L. Kronfeld, as Pittsburgh district sales agent for several cutting tool manufacturers.

o o o

• **Eugene C. Bauer**, president of the Kensington Steel Co., has been elected a director and vice-president of Poor & Co., Chicago.

• **Philip J. Sandmaier** has been appointed manager of Republic Steel Corp.'s Commercial Research Div., Cleveland.

• **Maj. C. Taylor Wettlaufer** has been elected president of the H. D. Taylor Co., Buffalo, succeeding his father, **Dr. Conrad E. Wettlaufer**, who becomes chairman of the board and treasurer. **Thornton H. McDougal** was named vice-president, and **Mrs. Conrad E. Wettlaufer**, vice-president and secretary.

• **Maj. Robert S. Fogg** has joined Edo Aircraft Corp., College Point, N. Y., and will be in charge of commercial float sales.

• **F. C. Hickey** has become associated with the Ganey Machinery Co., Buffalo. He was formerly with the Curtiss-Wright Corp.

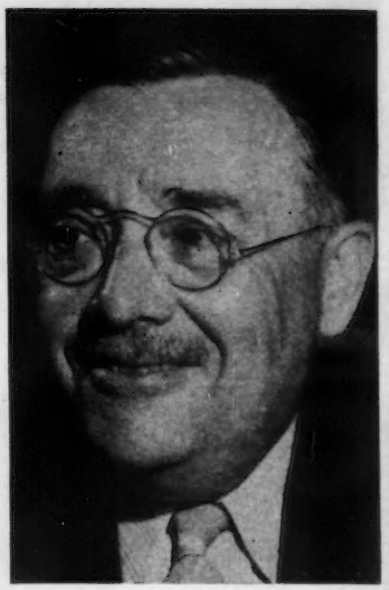
• **Benjamin M. McDade** has been appointed executive representative of Acme White Lead & Color Works, Detroit.

• **N. A. Moerman** has been appointed sales engineer of the Potter Instrument Co., Flushing, N. Y., designers and manufacturers of high speed electronic counting control equipment.

• **Albert W. Vanderhoof**, vice-president and general manager of the Standard Duplicating Machines Corp., Everett, Mass., has been re-elected president of the Office Equipment Mfg. Assn.

• **William A. Blees**, formerly vice-president and Pacific Coast manager of Young & Rubicam advertising agency, has been appointed vice-president in charge of sales for Consolidated Vultee Aircraft Corp., San Diego, Calif. Mr. Blees also will serve on the sales committee of the Aviation Corp., parent company of Consolidated Vultee.

• **Clark P. Bowman** has been appointed production and traffic manager of the Hanover Wire Cloth Co., Hanover, Pa. Mr. Bowman has been associated with the company for 15 years and was previously shipping clerk and supervisor of the shipping dept.



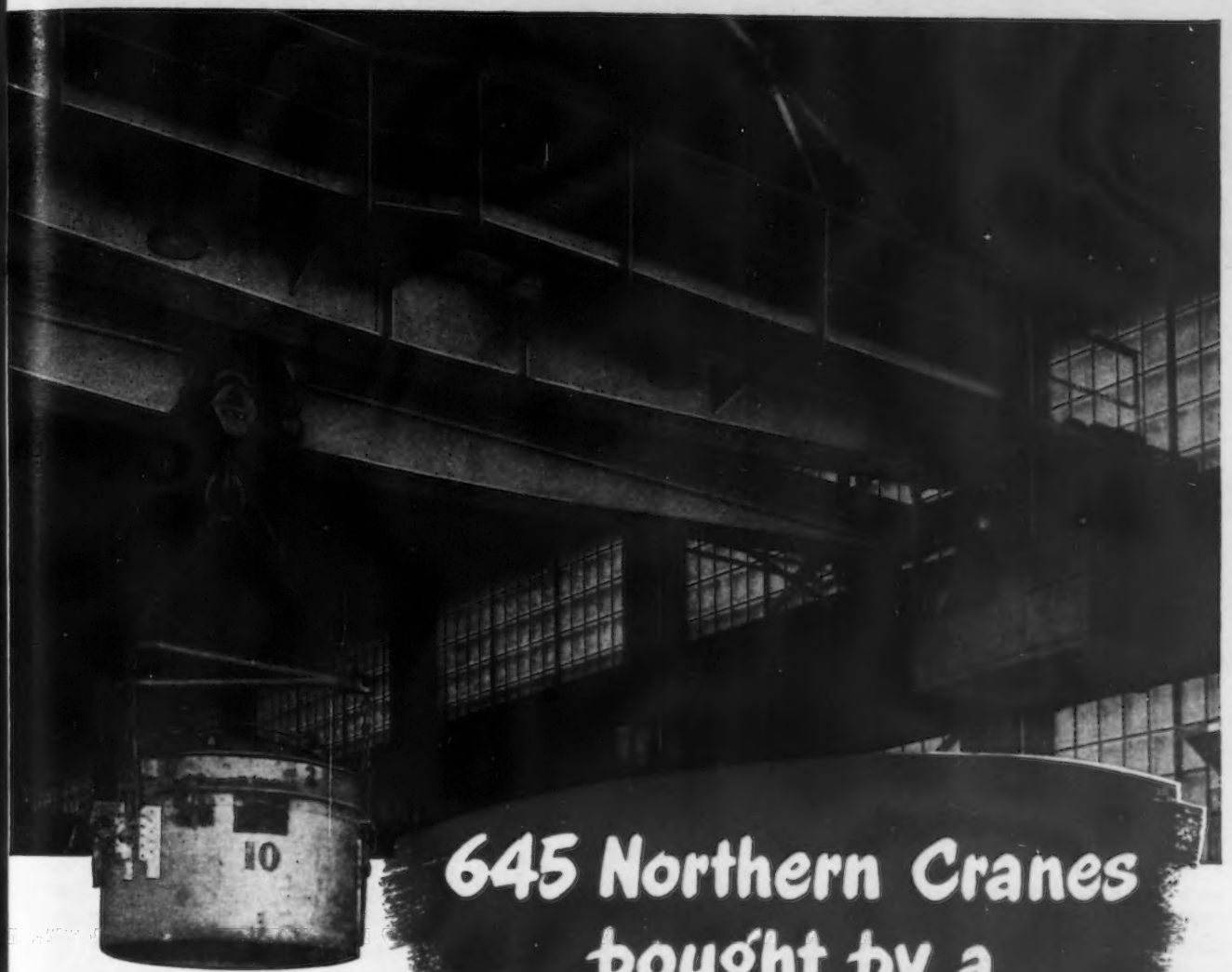
G. V. WOODY, manager, basic industries dept., Allis-Chalmers Mfg. Co.

• **G. V. Woody** has been appointed manager of the basic industries dept. of Allis-Chalmers Mfg. Co., Milwaukee, succeeding **R. C. Newhouse**, who has retired, but who will continue to act in a consulting capacity. Mr. Woody has been manager of the Pittsburgh district office since 1934, with the exception of 1941 and 1942 when he served as administrator of the company's priorities management organization in Milwaukee. He first joined the company in 1909, serving until 1926, when he left to become an executive with other concerns for an eight-year period. Mr. Newhouse has been an employee of Allis-Chalmers since 1905, and in 1940 received the "Modern Pioneer" award from the National Assn. of Manufacturers for his significant contributions to the American standard of living.

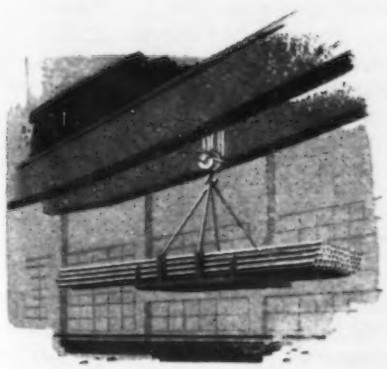
• **Charles B. Pickering**, formerly industrial application engineer in Connecticut for five years and more recently field engineer on radar equipment for the Bureau of Ships at Charlestown Navy Yard, Boston, has joined the Allen-Bradley Co.'s Boston office as sales engineer.

• **William M. Neal**, vice-president and secretary of Sloss-Sheffield Steel & Iron Co., Birmingham, has been elected president of Associated Industries of Alabama.

• **Comodore Bailey**, who has completed his 30th year, and **Claud M. Short**, his 25th year in the employ of E. C. Atkins & Co., Indianapolis, have recently retired.



645 Northern Cranes bought by a SINGLE Customer!



Placing scores of repeat orders over a period of years, one large company has bought a total of 645 Northern Cranes.

Only one conclusion can be drawn from this continuous repeat business—Northern produces cranes which give lasting satisfaction.

These orders have included cranes of every type—capacities 5 to 75 tons—and for every sort of service from powerhouse cranes to heavy duty high speed mill cranes.

This is the largest number of cranes we have sold any one customer; but many companies regularly place repeat orders for Northern Cranes and have large numbers of them in operation.

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Offices in Principal Cities

RALPH G. LAGERFELDT, vice-president, Colonial Broach Co.

• **Ralph G. Lagerfeldt** has been elected vice-president and **Francis E. Pethick**, treasurer, of the Colonial Broach Co., Detroit.

• **A. T. O'Neill** has been elected president of the Buffalo Niagara Electric Corp., new utility operating company formed by the consolidation of several western New York units of the Niagara Hudson Power System. **Paul A. Schoellkopf** has been named chairman of the board and **Col. William Kelly**, chairman of the executive committee.

• **James L. Geddes**, Governmental Sales Div., Caterpillar Tractor Co., has been appointed representative in charge of the company's Washington office. He joined the firm three years ago and was placed in charge of the governmental section, later becoming eastern division credit manager. He was recently promoted to the Governmental Sales Div.

• **Landon Browne** has been appointed technical sales representative of Standard Varnish Works, Port Richmond, N. Y., in upper New York state and northwestern Pennsylvania. Mr. Browne has been associated with the Standard Varnish Works as a chemist in their laboratories for many years.

• **Col. Thomas A. Murphy** has been named aviation industry manager for the Reynolds Metals Co., New York. Col. Murphy, released recently from the U. S. Army Air Forces for which he served as plant representative, formerly was aviation manager for Berry Brothers, Detroit, and assistant to the president of United Aircraft.

• **Robert C. Downie**, president of the Peoples-Pittsburgh Trust Co. and former chief of the Pittsburgh ordnance district, was elected to the board of trustees of the Blaw-Knox Co., Pittsburgh.

• **W. G. Bowman** has been appointed manager of the branch office of the Harnischfeger Corp., which has been established in Buffalo to serve western New York and northwestern Pennsylvania.

• **Laurel W. Botts**, formerly assistant to the general manager and contract manager of the Kenmore plant of the Curtiss-Wright Corp., has joined the estate planning staff of the Manufacturers & Traders Trust Co., Buffalo.

• **William J. Peltz** has been named general production manager of the Refrigerator Div. of Philco Corp., Philadelphia.

• **Frederick Latreille** has been elected vice-president of L. D. Seymour & Co., Inc., New York.

• **Robert M. Hatfield** has resigned as deputy vice-chairman of the WPB to become assistant general sales manager of Combustion Engineering Co., New York. Mr. Hatfield came with Combustion Engineering Co. in 1934 as a student engineer and went to Washington in 1942.

• **Gordon W. Monfort** has been appointed director of the news bureau of Caterpillar Tractor Co., Peoria, Ill. He first joined the Caterpillar advertising dept. in 1928, and in 1937 became western division advertising representative, a position he held until 1941 when he became personnel director of the San Leandro, Calif., plant.

• **Robert G. Allen** has been appointed general sales manager of the Baldwin Locomotive Works, Philadelphia. Mr. Allen joined the Baldwin organization in March 1945, as general manager of Baldwin Southwark Div. of the company, which position he held until his recent appointment.

• **Norman J. Froelich**, formerly with the Keystone Steel & Wire Co., has joined the sales force of the Reynolds Wire Co., at Dixon, Ill., and will be in charge of their Chicago office. **H. Allen Sisson**, formerly with the Michigan Wire Cloth Co., at Detroit, has joined the sales force of Reynolds Wire and will be in charge of their Detroit office.

PAUL C. VAN CLEAVE, manager of rolled product sales, Colorado Fuel & Iron Corp.

• **Paul C. Van Cleave** has been appointed manager of rolled product sales, Colorado Fuel & Iron Corp., Denver. After working in the mill during vacations in his youth, Mr. Van Cleave joined the sales dept. in 1934, and in 1936 was appointed district sales manager at Amarillo, Tex. The following year he moved to a similar post at El Paso, Tex. In 1940 he returned to the general offices at Denver as assistant to the sales manager where he remained until joining the Army Air Forces in 1942.

• **J. P. Lyons**, Ohio district sales representative since 1920 for Elwell-Parker Electric Co., Cleveland, has retired. **R. F. Crawford**, long associated with Mr. Lyons, will continue to represent Elwell-Parker in Ohio, in the sale of power industrial trucks.

• **Robert S. Kirksey**, vice-president and general manager of Fruehauf Trailer Co., Los Angeles plant, has been made president. **Walter J. Pickhardt**, sales manager, was promoted to vice-president and general manager.

• **Col. Louis F. W. Stuebe** has returned from the armed services and rejoined the Chicago sales engineering staff of the Hyatt Bearings Div. of General Motors Corp. He will specialize in Hyatt railroad applications. Mr. Stuebe first joined Hyatt as a sales engineer in June 1925.

• **D. J. Fox** has been elected president of Fretz-Moon Tube Co., Inc., Butler, Pa.

C. E. RILEY, general sales manager, Carbon Steel & Strip Div., McLouth Steel Corp.

• **C. E. Riley** has been appointed general sales manager of the Carbon Steel & Strip Div. of McLouth Steel Corp., Detroit, to work in conjunction with **L. E. Moultane**, vice-president in charge of sales. Mr. Riley has been with McLouth for the last 14 years.

• **Dr. William T. Griffiths**, of London, has been elected a vice-president and director of the International Nickel Co. of Canada, Ltd. In both these offices, he succeeds the late **David Owen Evans**. Dr. Griffiths is chairman of the Mond Nickel Co., Ltd., the British affiliate of International Nickel and is president of the Institute of Metals of Great Britain.

• **T. H. McGraw, Jr.** has resigned as general manager of the Braeburn Alloy Steel Corp., Braeburn, Pa. He was formerly president and chairman of the board of the corporation from 1926 until 1944 when Continental Industries, Inc., bought all the stock of Braeburn. **Norman I. Stotz** will function as executive vice-president and takes over most of Mr. McGraw's previous duties.

• **R. Wayne Gates** has been added to the research and development staff of the Pemco Corp., Baltimore. **John Steencken** has been made a part of the service organization, and **William Cooper** of the laboratory staff is now at the University of Ohio doing research work for the U. S. Government.

• **Evan V. Quinn**, formerly New York sales manager of Edge Moor Iron Works, Inc., has been elected vice-president and general sales manager of United Steel of America Inc., New York. Mr. Quinn has been with Edge Moor Iron Works Co. since 1936 and prior to that time was New York sales engineer for Struthers Wells Corp.

• **John Sheppard**, formerly chief metallurgist of Kelsey Hayes Wheel Co., and more recently plant manager and metallurgist of Michigan Metal Treating Co., Detroit, has been appointed metallurgical technical service representative to the metal trades in Detroit, by American Cyanamid & Chemical Corp., New York. **Victor R. Farlow** has accepted a position with the corporation as a technical service representative. He will be a member of the Chicago district office and will furnish metallurgical service to the metal treating industry. Mr. Farlow was formerly with Caterpillar Tractor Corp. and during the war was metallurgist at the Caterpillar military engine plant, Decatur, Ill.

CARL J. DINIC, executive assistant to the president, American Locomotive Co.

• **Carl J. Dinic** has been appointed executive assistant to the president of American Locomotive Co., New York. Mr. Dinic became associated with the company in July 1943, as assistant to the president. Prior to that he was with U. S. Steel Corp. of Delaware, with offices in Pittsburgh, and with Eastern Gas & Fuel Associates, Boston.

• **Stephen B. Metcalfe** has been named special engineer in charge of rope plant development, American Steel & Wire Co., and will be located in the chief engineer's office in Cleveland. **A. J. King** has been appointed general superintendent of the New Haven and Trenton works and will center his activities at New Haven. **Charles R. Chase** has been made superintendent of the Trenton works, succeeding Mr. King.

OBITUARY...

• **Frank C. Roth**, 56, field engineer for the George J. Meyer Mfg. Co., Milwaukee, died Oct. 18, after a long illness.

• **Elbert Rodgers**, president of the Elbert Rodgers Coal Corp., Buffalo, died Oct. 28. Before engaging in the fuel business, he had served as traffic manager and purchasing agent for the Wickwire Spencer Steel Co.

• **Oliver Stangland**, who represented Charles Bond Co. of Philadelphia, and Bond Foundry & Machine Co. of Manheim, Pa., for the past 20 years, died Oct. 29 in Chicago.

• **D. Hewitt Wood**, 74, formerly president of the Converse Bridge & Steel Co., Chattanooga, Tenn., died recently.

• **Henry Zscheck**, president of the Atkins Pioneer Club in 1926, died recently at the age of 73 years. He had been employed by the E. C. Atkins & Co., Indianapolis, continuously for 55 years, retiring in 1943 because of failing health.

• **Carl E. Gebuhr**, 64, assistant sales manager for Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., and who had been associated with the firm for 35 years, died recently in a hospital there after undergoing an operation.

• **William G. Golden, Jr.**, 62, retired vice-president of the Reynolds Metals Co., Richmond, Va., and one-time New York City transit engineer, died at his home in Louisville, Ky., on Oct. 29, after a long illness. Mr. Golden also was president of the Reynolds Alloys Co., affiliate of Reynolds Metals, until he retired early this year.

• **Frank C. Angle**, 45, manager of district offices for the Allis-Chalmers Mfg. Co., Milwaukee, died Oct. 18 in a hospital there after several months' illness. He came to Allis-Chalmers in 1929 from the Elliott Co., Jeanette, Pa.

• **William E. Kane**, 79, founder and president of Kane & Roach, Inc., Syracuse, died Oct. 11.

Dear Editor:

NO SHIPBUILDING UTOPIA

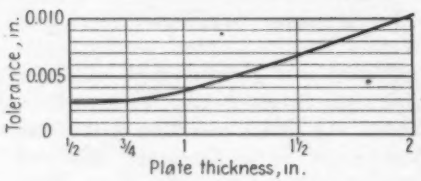
Sir:

In response to the open letter in your Dear Editor section of the Sept. 27 issue under heading "No Shipbuilding Utopia," I can assure Mr. McClung that it was not my intention to create the impression that the shipbuilder is approaching a state verging on Utopia especially since the writer is fully aware of the fact that there is no panacea, no royal road to the solution of shipbuilding problems. I respect the rights of a reader to audit my writings and criticize in way of opinion in the form of constructive criticism, provided same is not tinctured with undercurrents of irony. Obviously, it is in point to clarify the issue.

In sum, the development of the cam mechanisms does not happen to be my brainchild but is representative of the pooled knowledge of master craftsmen from other fields of endeavor, who, once they got the "feel" of the new environment, displayed their pioneering ability by a willingness to depart from the habits that traditions have fostered and by tending themselves to meet challenging conditions. In other words the achievement as a whole was the outcome of a "melting pot" of ideas.

It is a well established fact, known to all experienced loftsmen the world over, that the contracted method of fairing is essential in laying off the lines of a vessel, in order that the curvature may be accentuated whereby the disproportion or irregularities in the development may be corrected by visual observation of the fairing battens. If Mr. McClung is inclined to doubt the authenticity of this statement, I suggest that he confer with the chief loftsman of his yard, and I can assure him in advance that the C. L. will confirm what I have just stated. In any event, the effectiveness of the process of successive elimination of errors in the modification of cam lineswork is equally true. While the measurements, in general, are taken to the nearest thirty-second of an inch, it was possible to gain added refinement in way of tolerances by nesting the cam templates, throughout the deadflat area of the vessel, so as to lie close and snug. Consequently, it is possible to maintain the tolerance of 0.003 plus or minus as mentioned. In the case of the hull form after leaving the middle body it appears far beyond the realm of probability that such tolerances could be maintained due to the diversion of the complementary sight edges in flat development. Concerning the human element of error in measurement the point is this: With proper programming and a well organized mold loft staff where the work is not just spot-checked but double checked the percentage of errors emanating from the mold loft will not exceed 2¼ pct.

I am bemused by the statement of why the necessity of locating frame lines, water lines, etc., nor do I concur with the McClung viewpoint that many will question the necessity of having such lines on shell plating of an all welded ship unless the remark is qualified to mean persons unfamiliar with the entire fabrication and



placement procedures. While a minimum of reference markings may suffice on the ways, in order for a shell plate to maintain its true relative shape and position in the vessel there is not only the necessity of shell plate development to the molded lines of the vessel but the furnishing of shell sets, set to frame lines, plotting roll lines, finding the amount of backset, etc., in order that the rolls operator may fashion the plate to the shape intended. It is more to the point to underscore the necessity for such procedure; to do otherwise is the result of negative thinking. It is sheer illusion to believe that there is any wide disparity in the let's say "modus operandi" of the various yards as to reference markings to facilitate ship assemblies of all kinds. It is obviously and admittedly impossible to position the component parts without such identification.

From an operations standpoint, the cam process has had a tremendously beneficial effect in way of speed of output and accuracy in processing. It has been time-tested—4¾ yr—and production proved by key operators, who know all the influencing factors, whose acumen and experience measures up to the demands of the industry.

In order to put a hard-punch climax to this epistle and drive home with dramatic impact what can be done in the way of controlled flame cuts by experienced operators by correct setting of the torches with due regard for the kerf width, is best exemplified in the accompanying explanatory graph. As further proof of my contentions I am taking the liberty of quoting one paragraph from an article on "Flame Cutting and Machining" by Edwin Laird Cady that appeared in the issue of *Metals and Alloys* which reads as follows: "Much of modern flame cutting is controlled by highly accurate machine guideways, pantographs and the like. Within the limits held in most machining operations (but not in grinding and lapping operations) machine controlled flame cuts can be as accurate as the guides hold them. Ordinary limits of the cutting accuracy of the flame itself, if properly guided, are:

Mild steel, not over 0.35 pct C.
Stock to 1 in. ± 0.003 in.
Stock to 2 in. ± 0.010 in.
Stock to 4 in. ± 0.0175 in.
Stock to 6 in. ± 0.0312 in."

Let me conclude by saying that it is a foregone conclusion that practicality of the cam process in a shipyard is confined to mass production methods and would be overwhelmingly unfavorable from a financial standpoint, if applied to the individually constructed custom built ship. But what appeals to me is the other side of the picture by taking into account that cutting of irregular contours is not a problem peculiar to the shipbuilding industry. The motive back of the presentation was the dissemination of information regarding this development through the medium of this trade journal in order that tomorrow-minded executives in other allied industries might perchance utilize the idea in the processing of large irregular shaped units on a mass production scale.

CYRIL PROVO HUBERT,
Executive Vice-President and General Manager

Olson Steamship & Navigation Corp., Los Angeles

DIECASTING DESIGN

Sir:

We would appreciate your sending us two copies of the article by H. L. Harvill and P. R. Jordan on "Diecasting Die Design" printed in the Sept. 13 issue.

ROBERT C. CORNELL,
Metallurgical Dept.

Dow Chemical Co., Midland, Mich.

● Tear sheets have been mailed.—Ed.

ATOMIC BOMB SIDELIGHTS

Sir:

Please send a reprint of the article "Atomic Bomb Sidelights." We are enclosing 10¢ in coin to cover the cost.

KATHERINE KOLENKOW,
Library

E. I. du Pont de Nemours & Co., Niagara Falls, N. Y.

● Reprint has been mailed.—Ed.

ONE BUTTON

controls completely automatic operating cycle

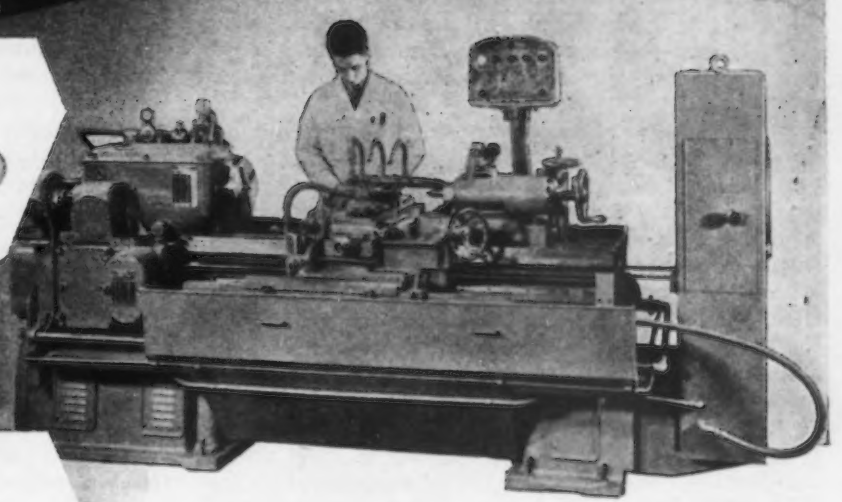
QUICK SET UP

permits low cost automatic operation even on short runs

4 NEW FEATURES for faster, better, turning

CONTROL PANEL

. . . within reach of operator's right hand



6 TO 1

spindle slow-down for use with rear carriage

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The redesigned Monarch Magna-Matic is setting new standards for low-cost, high-quality turning, even beyond those set up by the 10-year-proved former design. • It utilizes the lastest developments in all-electric controls and incorporates other important improvements gained from the illuminating experience of widely varied wartime production. • Every finished piece is perfectly interchangeable, whether from first or later runs, because it is gaged from a thin metal template. • For automatic or semi-automatic operation, no other turning machine can match the Monarch Magna-Matic. • Ask us for details and job analyses for faster, higher quality, lower-cost turning.

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This Industrial Week . . .

- **OPA May Announce Price Changes This Week**
- **Steel Industry Girds for Last Ditch Fight**
- **Ingot Rate Rises Two Points to 79.5 Pct**

BADGERED by union demands and hemmed in by governmental price policies, the steel industry this week said indirectly that it has had enough and is now putting up a solid front which may soon result in a bitter fight to the finish in what it considers to be fair play. The somewhat surprising and very unusual departure of steel companies from individual or separate announcements and pronouncements to large advertisements and national radio talks sponsored by the American Iron & Steel Institute is apparent warning of girding for a consolidated showdown.

Along the wage-price front the steel industry has practically told the government that until the long overdue and greatly needed price adjustment is made by OPA, there will be no negotiations with the union, or at least to engage in such would be more than futile. Whether or not the government will meet this ultimatum remains to be seen, but Chester Bowles, OPA Administrator, is expected this week to announce the policy which he will take in granting steel price adjustments to cover accumulated material and labor costs.

The expected OPA announcement may possibly be in the form of a percentage increase in steel prices, the distribution of which would be worked out by the OPA Steel Industry Advisory Committee, composed of top executives in the industry. Mr. Bowles is said to have promised an announcement for the latter part of this week. However, the number of promises and counter-promises made with respect to steel price adjustments over the past 60 days, none of which have been fulfilled as yet, has served to make the present steel price-wage situation a latch ditch controversy.

A byproduct of the united and militant stand of the steel industry may be an opening for Philip Murray, CIO and USWA head, actively to push for industrywide collective bargaining, a goal which he has sought for some time. Some members of the steel industry are known to favor industrywide bargaining, while others have favored individual company negotiations. However, the current solid front of the industry seems to indicate that since the steel companies are now of one accord on all points, the subject of industrywide bargaining will take more tangible form.

Lurking behind the preparation for a serious battle in the steel industry over the question of wages and prices is the probability of an industrywide strike by the end of this month or early in December after votes have been tabulated. It may be the desire of both steel management and the unions to test each other's ability or power in negotiating the troublesome wage question. Since the industry has abandoned its lamb-like attitude in public and since Philip Murray has taken the position that his union wants a wage increase "without dickering or compromise," it does not take much speculation to anticipate some type of steel production shutdown because of strikes.

THE return of steelmaking operating rates this week to pre-coal-strike levels is allowing many producers to begin working down a huge backlog of business. On the other hand incoming orders in the past week have increased in volume. Some mills report the volume of new business about 50 pct ahead of shipments, with the result that deliveries on many items this week have again become extended. Any progress made because of the higher steel operating rates will have little effect on improving deliveries on orders placed at this time because most mills have been keeping in their pockets orders which could not be scheduled.

Inquiries for 38,000 freight cars are expected to be distributed this week which should result in heavier freight car building. Railroads have virtually completed specification of their 1946 rail requirements, but are still in the dark as to what proportion the steel industry can or will fill.

Concrete reinforcing bar sales for the fourth quarter have averaged over 100,000 tons a month, with October indicating more than a quarter of a million tons. This avalanche on bar mill schedules has resulted in billet producers being sold out during the second quarter of 1946. Structural steel fabrication is being delayed through the inability of fabricators to detail jobs rapidly.

ONE of the first expansion programs of a smaller steelmaker in the past 10 to 15 yr was the purchase last week by Sharon Steel Corp. of Carnegie-Illinois Steel Corp.'s Farrell, Pa., Works. Sharon will assume control on Dec. 15 and the acquisition will boost Sharon's ingot capacity by about 250,000 tons. New electric furnace capacity is contemplated.

Steel ingot production this week throughout the country has increased two points to 79.5 pct.

The scrap situation has again become tighter this week with supplies harder to get and with prices straining at ceiling levels. The dearth of No. 1 heavy melting scrap has caused some sentiment in the trade to consider asking for a 10 pct increase in the ceiling price of this item. Under the ceiling price setup, No. 1 heavy melting steel carries the same price as No. 2 heavy melting and, with the cost of preparing scrap higher, the available supply of No. 1 is dwindling.

Announcement of the Surplus Property Administration that a program is being formulated for the distribution of surplus machine tools through normal channels of trade, came as an anti-climax due to the length of time consumed in arriving at such a decision.

• **U. S. STEEL SHIPMENTS**—Shipments of finished steel products by subsidiary companies of the U. S. Steel Corp. for the month of October 1945 were 1,290,358 net tons, compared with 1,321,576 net tons in September, a decrease of 31,218 net tons; and with 1,774,969 net tons in October 1944, a decrease of 484,611 net tons. Shipments for the first ten months of 1945 were 15,678,067 net tons, compared with 17,639,435 net tons in the comparable period of 1944, a decrease of 1,961,368.

• **FREIGHT RATE PETITION DENIED**—Petitions for reconsideration of its order increasing freight rates on iron and steel to Iowa, Minnesota, Michigan and Wisconsin from midwestern producing points, under I. & S. docket No. 5269, have been denied by the Interstate Commerce Commission. Petitions were filed by the Office of Price Administration and others. Petitions seeking postponement of the effective date of the order to allow for reopening and further investigation had been filed by the Minnesota Railroad and Warehouse Commission, Iowa State Commerce Commission, St. Paul Assn. of Commerce, Minneapolis Traffic Assn.

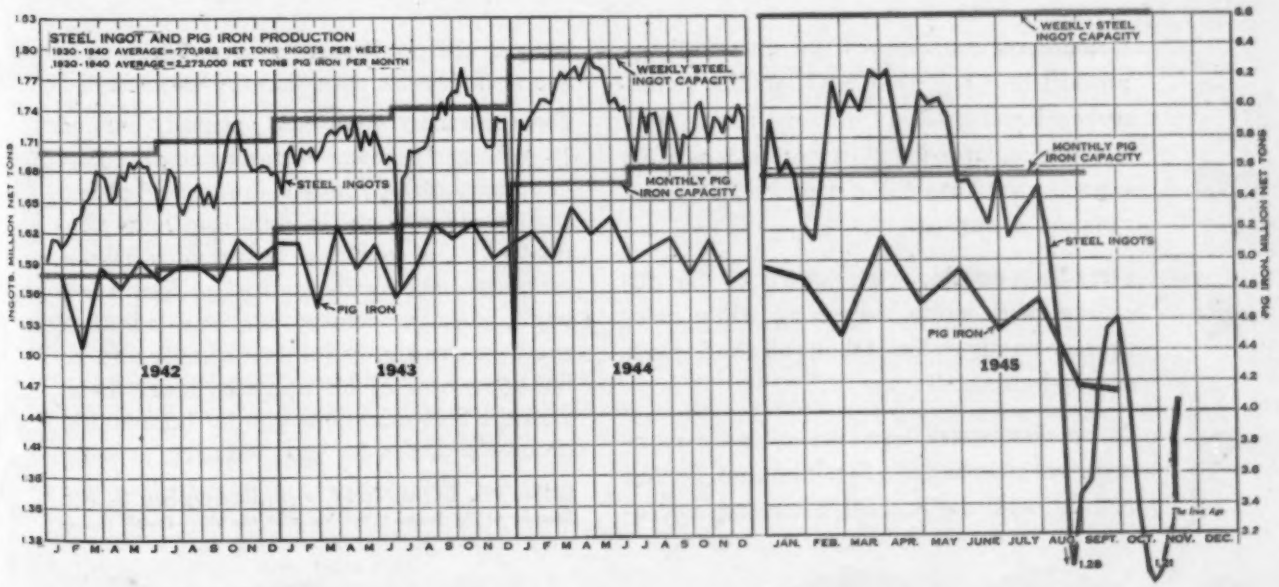
• **SCRAP STOCKS DOWN**—Stocks of iron and steel scrap at plants of consumers, suppliers and producers at the end of July 1945 approximated 4,762,000 gross tons, a 2 pct decrease from the 4,847,000 tons reported on June 30, 1945, according to a statement released by the Bureau of Mines. Consumers' stocks on July 31 amounted to 3,611,000 tons, compared with 3,678,000 tons on June 30, while combined stocks of suppliers and producers were 1,151,000 tons and 1,169,000 tons on the same dates. The consumption of purchased scrap and home scrap is lower than in June. On the other hand, pig iron figures show an increase in stocks as well as a higher consumption. The production and salvage of scrap is less in July.

• **INGOT MOLD PRICING**—Made effective immediately OPA on Nov. 6 announced adjustable pricing for ingot molds and ingot mold accessories. Under the finding producers may adjust prices to increase in prices of pig iron and its conversion into molds and accessories. Pig iron prices were recently increased $1.75 per tons but, OPA said, charges for converting it into molds has not changed since 1937. OPA action also removes ingot molds and accessories from the coverage of the gray iron castings regulation and places them under machines parts and industrial equipment regulation. This action, it was pointed out, will overcome confusion in the trade regarding which regulation covered these items. Since ingot molds and accessories are ferrous castings made from pig iron but are sold as commodities other than as gray iron castings, OPA explained, the provisions of the machines parts and industrial equipment regulation adequately cover them.

• **COKE INVENTORY CONTROLS DROPPED**—OPA has announced all controls will be eliminated on Nov. 15 on gas production and on coke inventories because of an expected early return to normal by-product coal production. Elimination of these controls will be effected through revocation of Order U-10 and Direction 4 to Priority Regulation 32. The U-10 order required gas manufacturers to put into maximum operation all facilities for the production of water gas or gas manufactured from oil and coke and to reduce to a corresponding extent the production of coal gas, while Direction 4 to Priorities Regulation 32 limited coke inventories generally to a 20-day supply. Both of these regulations were issued on Oct. 10 to conserve supplies in the event of a continuation of the coal mining stoppages which were occurring at that time.

• **SURPLUS PROPERTY DATA** — Surplus property declarations to RFC during September which were valued at slightly more than $225 million brought the total of surplus producers' and capital goods, exclusive of government-owned plants, to $3,758 million. Included in September declarations were steel, $8.3 million; nonferrous metals, $4.9 million; general purpose industrial machinery and equipment, $5.5 million; machine tools, $23.3 million; metalworking machinery, $7.6 million; fabricated metal basic products, $3.9 million.

• **NO SURPLUS HERE**—Eleven of the 12 buildings erected by the government on land leased from American Locomotive Co. at the Schenectady plant in 1942 have been purchased by the company and now are devoted to peacetime production, according to R. B. McColl, executive vice-president of the company. These buildings include four major and seven auxiliary structures. All were used for production of vital war materials including tanks and tank destroyers. Some of the buildings now will be devoted to the development of a new line of diesel locomotives soon to make its appearance.


STEEL INGOT AND PIG IRON PRODUCTION
1930-1940 AVERAGE = 770,982 NET TONS INGOTS PER WEEK
1930-1940 AVERAGE = 2,273,000 NET TONS PIG IRON PER MONTH
INGOTS, MILLION NET TONS
PIG IRON, MILLION NET TONS
WEEKLY STEEL INGOT CAPACITY
MONTHLY PIG IRON CAPACITY
STEEL INGOTS
PIG IRON
1942
1943
1944
1945
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1.28
1.21

Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
November 6...	73.5	79.0*	72.0	78.5	81.0	100.0	73.0	89.0	99.0	51.0	81.0	67.5	85.0	77.5*
November 13...	75.5	87.5	72.5	78.5	83.0	98.0	73.0	95.0	98.5	43.0	78.0	67.5	83.0	79.5

* Revised

SUN COMPRESSOR LUBRICANT

Ends Quarterly Shutdowns for Carbon-Cleaning in Air-Compressor

Compressor carbon was an unwanted by-product of a big plastics plant. The steam-driven Ingersoll-Rand air-compressor, with mechanical force-feed lubrication, was using a good brand of oil, but produced a "usual amount" of carbon.

Every three months, a shutdown of the air-system was made necessary while compressor-heads were taken off and parts scraped clean.

Carbon disappeared, however, after the management switched to a Sun lubricant. For ten months, with the Sun oil, it was not necessary to clean-out carbon once. Three complete shutdowns were thereby avoided.

Sun compressor lubricants, specially refined to withstand the temperatures and pressures of compression-cylinders, are typical of Sun industrial products. In light and heavy industry . . . in factories, textile mills, mines, tanneries, chemical plants . . . Sun lubricants, fuels, processing oils, and technical products are known for their quality and for the know-how of the men who make them. Call the Sun man near you for information on new products for your industry, or write

SUN OIL COMPANY • ***Philadelphia 3, Pa.***

Sponsors of the Sunoco News-Voice of the Air—Lowell Thomas

SUNOCO **SUN INDUSTRIAL PRODUCTS**

OILS FOR AMERICAN INDUSTRY

Labor Picture Featured

By General Discord and Resistance

Pittsburgh

• • • **The John L. Lewis-Philip** Murray squabble at the President's labor-management conference has left the management part of the conference with little to say and threatens to break up the meeting. U. S. Steel Corp.'s refusal of Lewis B. Schwellenbach's request to reopen wage raise negotiations with CIO under a special conciliator brought shouts of "defiance to the government" from Philip Murray. The National Labor Relations Board replied to Republic Steel Corp.'s request to dismiss the strike vote petition (duplicated in spirit by at least three other steel producers) that it had no power to disregard a union strike vote request where the union planned a strike in violation of a contract agreement barring walkouts. Higgins Industries, Inc.'s stockholders backed up Andrew J. Higgins' decision to liquidate the company, close the three boat building plants, and go out of business. Higgins closed up the plants on Nov. 1, during a controversy between the company and the AFL over a new contract. This summarizes the labor news of the past week.

As the first week of the labor-management conference ended, the labor end of the group found itself in such a back-alley cat fight that the entire conference threatens to end up in a puff of smoke, achieving nothing. Revolving around a disapproval of anything CIO by all other represented labor organization, a coalition of which has successfully stymied Philip Murray's best efforts to net any worthwhile gains from the conference up to this time. While there is still a split in agreement between separate divisions of the AFL, the breach has not become wide enough for Murray and the CIO to complete the cleavage and gain support from any AFL faction. John L. Lewis came into the conference as the glittering union star, far outshining other labor representatives, and thus far has cleverly held the limelight.

On the steel wage fight facet of the labor diamond, Benjamin F. Fairless, president of the U. S. Steel Corp., in a letter to Lewis B. Schwellenbach, Secretary of Labor, stated that "OPA ceiling prices for steel products do not enable us to grant a wage increase at this time. In view of this determining factor, it seems futile to appear to engage in collective bargaining conferences on the union's demand for a general $2-a-day wage increase until after OPA has acted on the long-pending application of the steel industry for substantial increases in the present ceiling prices for steel products to compensate for past heavy increases in costs." Mr. Fairless stated that the President's recent speech did not change the basic situation described in the company's refusal to the CIO to grant a wage increase. He said that if progress is desired in resolving the wage demands through collective bargaining, the first step is through prompt and fair action by OPA in granting adequate increases in present ceiling prices. "In addition," Mr. Fairless pointed out, "we must have adequate assurances from OPA that such ceiling prices will also be increased so as simultaneously to compensate for any wage increase that may result from the union's wage demand."

In a telegram to Mr. Schwellenbach early this week Mr. Fairless again stated that it would be futile to reopen collective bargaining meetings until OPA acted on price increases for steel products. Mr. Fairless also pointed out that the union had demanded that the steel company agree to its demands "without dickering or compromise." Mr. Fairless indicated that this attitude was not collective bargaining.

Philip Murray, CIO president, agreed to Mr. Schwellenbach's suggestion to reopen wage negotiations. "We are in complete accord with the suggestion that collective bargaining conferences be conducted in the spirit of the President's recent radio address to the nation," said Mr. Murray.

Upon the corporation's refusal to meet, Mr. Murray asserted that U. S. Steel had assumed a "shocking and arrogant attitude and such defiance of the government's efforts to bring the corporation and the union together before a special conciliator raises a rather fundamental question." He continued with his often repeated argument on how the steel industry could pay the $2-a-day wage demand and still make lots of money from reduced taxes and reduced labor costs.

With Republic Steel Corp. firing the opening gun in requesting the NLRB to dismiss a strike vote petition filed by the CIO because existing contracts prohibit strikes, three other companies followed quickly in line with the spirit of this idea. Bethlehem Steel Co., in a letter to NLRB, Nov. 8, said that any filing of a strike vote notice or holding a strike vote would be in violation of the union-company contract, and protested the expenditure of public funds in conducting a strike vote in such a case. Allegheny-Ludlum Steel Corp. stated that it would meet the NLRB request to cooperate fully

DEFENDER: *John L. Lewis last week made what even diehard management people say was the best defense of the free enterprise system when he argued against the resolution of Philip Murray to incorporate the wage question into the labor-management meeting. Mr. Lewis, still consistent with his views in 1937, claimed that labor should not tie its wage demands to cost of living, price of hats, etc. In 1937 Mr. Lewis branded any tying of wages to cost of living as "chaining the worker to the economic wheel of chance."*

on the vote, but by this act both the board and the company would be parties to a violation of the contract between the company and CIO-USWA if a strike results. The letter charged that "if negotiations between the company and the union have broken down, it is only because the union chose to terminate them." The meetings recessed on Sept. 26 with the understanding that they could be resumed, and the strike vote petition by the union has served notice on the company that the union does not wish to settle the issue through collective bargaining. Likewise, U. S. Steel Corp. informed NLRB that it would cooperate on the strike vote ordered by the Board for Nov. 28, despite the fact that the vote is contrary to the contract between the CIO-USWA and the company.

Paul M. Herzog, chairman of the National Labor Relations Board, in a letter to T. F. Patton, Republic Steel Corp., which will probably be duplicated to other protesting companies, stated that the board lacked legal authority to disregard the union strike vote request where the union planned a strike in violation of a contract agreement barring walkouts. He said that under the Smith-Connally War Labor Board Disputes Act, the board was required to go ahead with the strike vote at Republic, since NLRB had no discretion to determine whether or not to conduct a strike vote irrespective of whether the strike was in violation of any agreement or law.

Sharon Steel Purchases Carnegie's Farrell Works; Takes Over on Dec. 15

Sharon, Pa.

• • • The purchase of the Farrell Works of Carnegie-Illinois Steel Corp., by the Sharon Steel Corp., was announced Nov. 10, by Henry A. Roemer, president and chairman of the board of the Sharon company. While Sharon Steel Corp. will not assume operations of the plant until Dec. 15, one of the blast furnaces was lit on Nov. 12 and the other, just rebuilt and enlarged, will be placed in blast as soon as possible. The openhearths were fired on Nov. 11, and plans were made to get the plant into full operation by Dec. 15. The acquisition of this plant will result in semi-finished materials of higher quality at lower cost, improvement of the company's competitive position, and employment of some 1800 that have been out of work since the plant was shut down on Oct. 7, because of the coal shortage.

Sharon Steel Corp. purchased all of the Carnegie-Illinois properties in Sharon, taking the U. S. Steel Corp. completely out of the district. The sale includes 591 acres of land, two blast furnaces, 15 openhearths, blooming and bar mills and buildings that formerly housed the sheet and tin mills of American Sheet & Tinplate Co., which were utilized during the war for the production of tank armor and other ordnance equipment. The facilities of the plant will provide sufficient iron and semi-finished steel to supply the finishing mills of Sharon Steel Corp. and its subsidiaries, the Niles Rolling Mill Co., Niles, Ohio, and the Detroit Seamless Steel Tube Co., Detroit.

Sharon Steel Corp. has in the past obtained its semi-finished materials from its plant at Lowellville, Ohio, some 26 miles from Sharon. The new capacity will eliminate the heavy transportation costs, estimated at $250,000 a year, between Sharon and Lowellville, and remove the problem of remote control and duplication of supervisory forces.

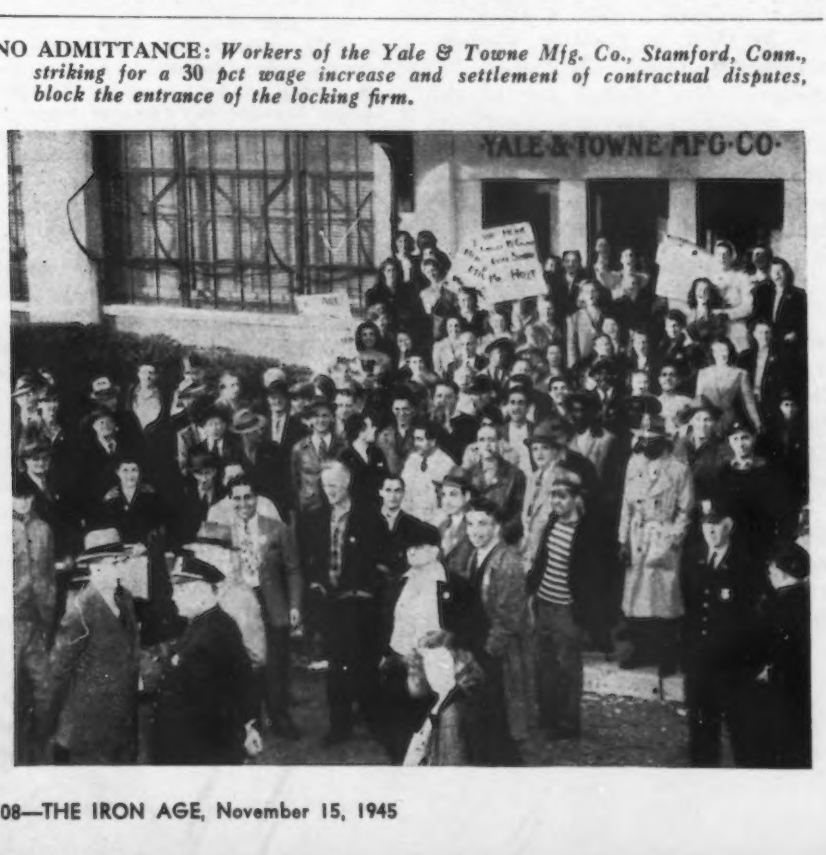
Disposition of the Lowellville property has not yet been completely decided upon, Mr. Roemer stated, but it is possible the plant will be abandoned after certain facilities have been removed.

Plans are underway for certain immediate additions at Farrell and a program is being formulated for long-range improvements at the plant. Immediately, two electric furnaces and new soaking pit capacity will be installed for the production of stainless and alloy steels.

The purchased property consists of two modern blast furnaces, each of 800-ton capacity. One of these two has just been completely rebuilt with the hearth and bell enlarged, and will not be lit until the lining is dry. The other was relined some time ago and has about 65 pct to 70 pct life left in its lining. These furnaces together are capable of producing 500,000 tons of basic pig iron per year. A 750,000-ton ore storage yard with a car dumper and an ore bridge; and a sintering plant of 375 tons daily capacity are included in the properties.

The 15 105-ton openhearths have an annual capacity of 750,000 tons of basic steel ingots. These furnaces have been fired this week. The 36-in. two-high, one-stand blooming mill is equipped with a full battery of six four-hole soaking pits that are producer gas fired. There is also a two-high, four-stand, 24-in. mill and a two-high, eight-stand 18-in. mill with full equipment for the production of slabs, billets, tube rounds and sheet bar, forging billets and other semi-finished products. Annual capacities of semi-finished are, approximately, 525,000 tons of ingots and slabs and 450,00 tons of sheet bars, tube rounds and billets. A long-idle 48-in. plate

NO ADMITTANCE: *Workers of the Yale & Towne Mfg. Co., Stamford, Conn., striking for a 30 pct wage increase and settlement of contractual disputes, block the entrance of the locking firm.*



mill was also included in the purchase, but the disposition of this equipment has not yet been decided upon.

The Lowellville, Ohio, plant, the final disposition of which has not yet been decided upon, has a blast furnace, known locally as the "Mary" stack, that is more than 100 yr. old. Also, the plant has a battery of basic openhearths and some electric capacity, as well as a two-high, one-stand blooming mill and a two-high, seven-stand, 21-in. sheet bar and billet mill. The Sharon plant of Sharon Steel Corp. is immediately adjacent to the newly purchased Farrell plant and is a finishing mill. Capacities of this plant are in the neighborhood of 350,000 tons of hot-rolled strip; 45,000 tons of cold reduced strip; and 20,000 tons of galvanized strip per year. With the Farrell plant situated where it is, the two units will be completely integrated and operated as a single iron and steel producing and finishing plant. While further additions and alterations to these combined properties are under consideration, complete plans have not yet been formulated. The purchase price of the Farrell plant was not disclosed, but Mr. Roemer indicated that no new financing would be necessary in making this acquisition.

The purchase was approved Nov. 10 by Sharon Steel Corp.'s directors and C. H. Butts, new operating vice-president, was elected to the board, succeeding J. H. Morrison. Business interests in the Shenango Valley were vitally concerned about the purchase and heralded it as the "best move for our community since Westinghouse chose Sharon as the place for its Transformer Div." With the steel corp.'s loss of interest in the valley activities, there was a great dent in the district's weekly pay envelope. By taking over the plant, Sharon Steel Corp. may well have stopped the beginning of Sharon's slide to the status of an industrial ghost town.

Consolidates Divisions

Schenectady

• • • **The Navy Ship,** Merchant Ship and Diesel-Electric Div., now a part of General Electric's Federal and and Marine Divs., have been consolidated into a new Marine Div., effective Nov. 1, according to the company. The appointments of E. K. Henley as manager and W. H. Wild as manager sales, of the new Marine Div. and the transfer of F. C. Ruling to Washington, D. C. as assistant manager there, were also announced.

Carnegie-Illinois to Produce Silicon Strip in Coils at Irvin Works

Pittsburgh

• • • **In continuing its** policy of modernizing steel plant facilities during the reconversion period, Carnegie-Illinois Steel Corp. will install at the Vandergrift plant of its Irvin Works, facilities for the production of silicon steel strip in coils.

To complete this program, a modern single stand reversing cold reducing mill will be transferred from the Irvin Works main plant to Vandergrift, and necessary annealing equipment and other finishing facilities will be installed. When completed, estimated in late 1946, the plant will be able to meet the new consumer demand for electric steel strip which is preferred by producers of electrical equipment.

Vandergrift was the first steel plant in the United States to produce silicon sheets, although they were previously manufactured in England. Silicon steel is used in the manufacture of transformers, motors, generators, and other similar electrical devices because they do not retain either positive or negative charges that are generated in the operation of such equipment.

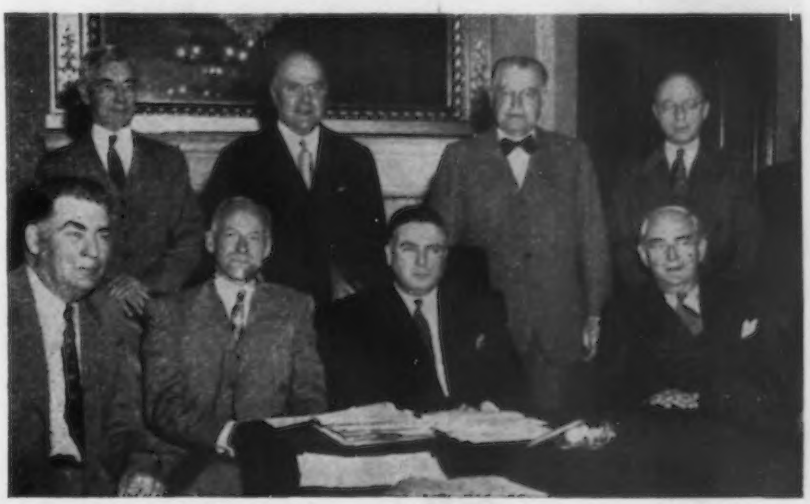
In the past, silicon steel has been delivered only as hot rolled sheets. The new program at Vandergrift is the result of intensive studies for the past several years by U. S. Steel metallurgists and engineers, who have developed means of producing silicon steel in coils as hot rolled or cold rolled strip. The work that will be done at Vandergrift in preparation for the production of this product is understood to cost in the neighborhood of several million dollars.

RFC Offers Heat Treat Furnaces and Epuipment

Chicago

• • • **Reconstruction** Finance Corp., surplus property div., Chicago, is offering for sale 493 units of heat treating furnaces and heat treating equipment, list No. 54, dated Nov. 1, shows. All types of both gas and oil fired heat treating furnaces and ovens are offered as well as several electric induction heat treating units. Several of the items have been designed for special uses, but most of them are adaptable to general operation. The list includes quench tanks and heat treating controls. Most of the equipment is used and is indicated as being in fair to good condition, although some new units are offered. All of the equipment listed is located in Illinois, Indiana, or Wisconsin. Purchase offers may be submitted immediately.

NO DECISION: *First meeting of the Senate's Atomic Energy Committee adjourned without reaching final judgments either on the direction of its investigation or the personnel to be required. Members are, seated, left to right: Senators Edwin C. Johnson, Colo.; Millard E. Tydings, Md.; Brien McMahon, Conn.; Arthur H. Vandenberg, Mich., chairman. Standing, left to right: Senators Thomas C. Hart, Conn.; Eugene D. Miliken, Colo.; Warren Austin, Vt.; Bourke B. Hickenlooper, Iowa.*



Pig Iron and Foundry Scrap Tighter Even Than During the War

Chicago

• • • **Increasing pig iron** requirements for civilian production coupled with sharply lowered blast furnace operations on merchant iron finds the nation's foundries living from hand to mouth for iron requirements.

A long cast iron scrap famine makes impossible a greatly increased dependence upon scrap to alter charging ratios.

Despite the tight situation, no allocations or priorities on pig iron have been requested from the Civilian Production Administration in Washington. The CPA is authorized under Order M-21 to make pig iron allocations through its Washington office in cases of emergency when users have exhausted normal supply channels. An alternate form of relief is afforded by Direction 4 to Priorities Regulation 28 through which application may be made to CPA field offices for preference rating. This is available in cases in which material supply constitutes a production bottleneck which cannot otherwise be broken and which is delaying reconversion. Direct application to the CPA Steel Div. at Washington is regarded as a more direct means of securing assistance which, in many cases, can be arranged without direct recourse to formal channels.

The CPA emphasizes its willingness to give assistance when called upon.

Pig iron suppliers generally prefer that widespread use of priorities not be made, feeling that once they are issued to a few users transactions in iron by the entire industry will become entangled in a complicated priorities situation.

Foundry pig iron inventories in the Midwest are far below the legal limit, amounting to only one or two day's supply in many instances. So far, reports of shutdowns due to lack of pig are without verification. Some charge ratio alterations are being made using iron other than normal analysis, such as silvery iron. Relatively small supplies of special iron prevent such substitutions from becoming widespread, however.

Suppliers in this area characterize the situation as being tighter than at any time during the war, during much of which pig iron was on complete allocation.

Merchant iron production, cut more severely than steelmaking iron during the coal strike, has not rebounded as rapidly as the steelmaking product, mills preferring to assign all possible blast furnace capacity to their own unfulfilled steelmaking requirements. A leading steel producer in this district, which normally makes about 20,000 tons of merchant iron per month, has had no blast furnaces on merchant iron since the strike. Production of merchant furnaces likewise has not yet regained pre-strike levels. Some relief in this district will be afforded when Interlake Iron Corp. blows in its Zenith furnace at West Duluth, Minn. in the near future. This furnace has been down for rebuilding. Other merchant pig production in this district has been on a normal basis, Interlake having two furnaces operating at Chicago and Wisconsin Steel Co. with one furnace on merchant pig.

Announces Production Of High-Grade Sponge Iron in Brick Plants

Washington

• • • **Sponge iron comparable** in quality to that made in the famous ceramic plants at Hoeganaes, Sweden, can be produced by carbon reduction in American common shale-brick plants without alteration of the plants according to the Bureau of Mines.

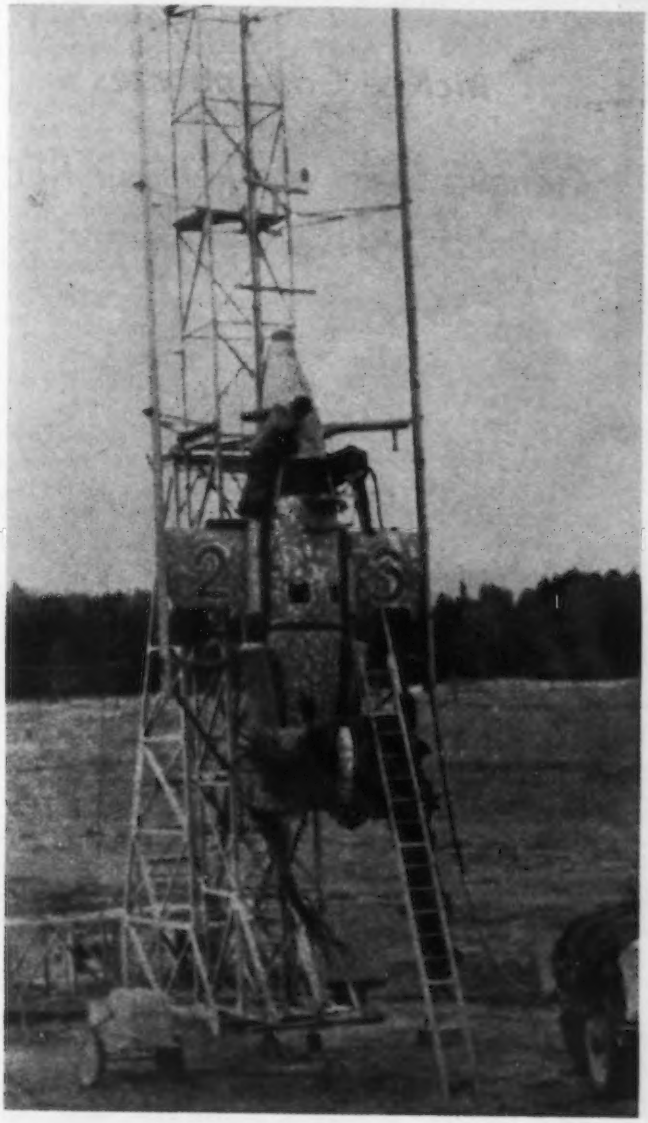
Experiments conducted by the Bureau at a New York State brick yard and at an Ohio quarry demonstrated that the two most common types of Swedish sponge iron said to be superior for use in furnaces where high-grade steels are made, can be duplicated readily in tunnel kilns or periodic down-draft kilns.

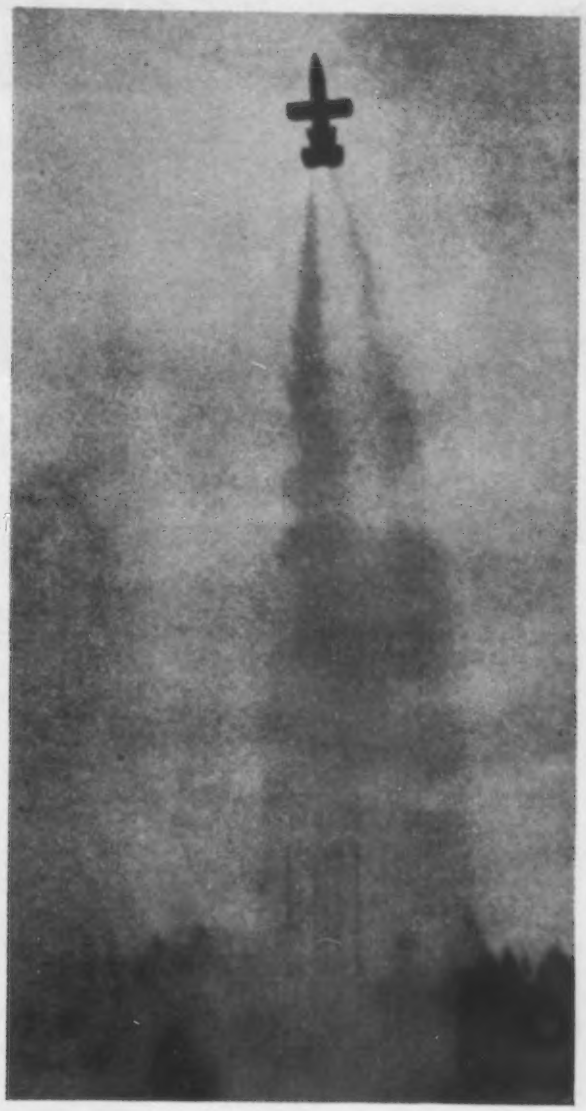
Donald W. Ross, Bureau chemical engineer, said about 100 tons of brickyard sponge iron was made by the regular brickyard personnel with the equipment already at the ceramic plant. Of this amount, 62 tons, made from commercial magnetite concentrates, were shipped to three steel plants where it was used to replace some of the scrap in the regular steel furnace heats.

The Swedish sponge iron process involves filling clay refractory containers with iron ore plus the necessary quantity of solid reducing agent, and then firing in an ordinary ceramic kiln. A characteristic of the Swedish sponge iron is the remarkably low sulfur content, which is obtained by mixing a desulfurizing agent with a solid fuel reducing agent.

Copies of the Bureau reports on sponge iron, which are listed separately as Report of Investigations 3819, "Reduction of Iron Ore in Clay and Steel Containers (Saggers)"; Report of Investigations 3822, "Production of Sponge Iron in a Shale-Brick Plant;" and Report of Investigations 3824, "Determination of Metallic Iron and Oxygen in Sponge Iron," may be obtained at no cost by writing to the Bureau of Mines, Department of the Interior, Washington 25, D. C.

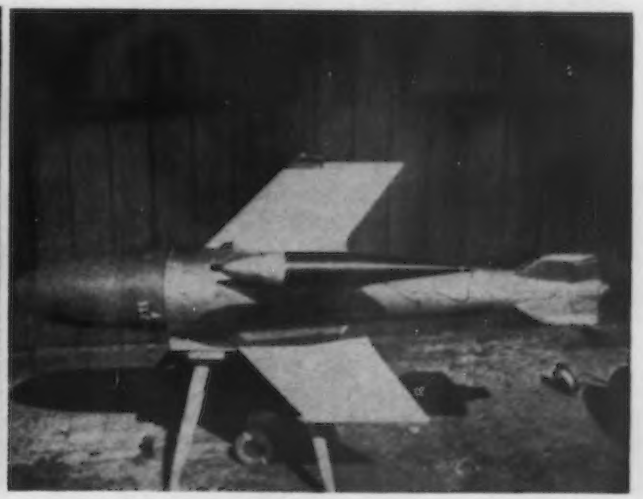
TELEVISION CAMERA: *An automatic camera developed by engineers at the Remington Rand plant at Middleton, Conn. When fitted into the nose of a winged bomb, the missile reports what it sees to the instant of impact.*





Germans Develop Antiaircraft Rocket Weapons

• • • **These German** photos show development of rocket-propelled missiles. Lower left pictures the "Viper," designed to attack aircraft with cannon, rockets or by ramming. Upper figures show rockets shooting the "Viper" from ramp; pilot automatically ejects himself before ramming. At lower right is the X-4, equipped with proximity fuze, for launching from a parent plane against bombers.



TEMPORARY ORPHAN: *The Geneva Steel plant, one of the most widely discussed plants in history, may soon find a parent. With U. S. Steel Corp. as possible owner out of the picture, another excursion into the sea of red tape may be necessary before a final sale or lease is made.*

McKee Co. Analyzes Geneva Steel Markets for RFC

o o o

By L. W. MOFFETT

o o o

Washington

• • • **The Arthur G. McKee & Co.** report to RFC estimates the actual cost of the Geneva steel plant at $190,355,066. The replacement cost of the plant is placed at $134,000,000 and cost of an equivalent plant is fixed at $121,500,000. Of these costs mines and quarry represent $13,665,715 as the actual cost, $10,373,000 as the replacement cost and $9,456,000 as the equivalent cost. For the acquisition and preparation of the site, acquisition and land for water supply and reservoir and equipment and facilities, the actual cost is $176,689,351; the replacement cost, $123,627,000 and the equivalent cost, $112,044,000. The actual cost of equipment and facilities alone is given as $175,363,837, the replacement cost, $122,736,000 and the equivalent cost $111,153,178.

Discussing the selection of products for postwar manufacture, the report says that insofar as freight rates are the limiting factor, the market areas for Geneva in the United States will comprise substantially all of the territory in the country to which such rates will be as low as or lower than those from the large eastern steel plants. On this basis, it is pointed out, domestic shipments from Geneva would be largely restricted to two groups of states, one (Pacific Coast section) comprising Washington, Oregon and California, the other (Rocky Mountain section) Idaho, Montana, Wyoming, Colorado, Nevada, Arizona and New Mexico.

In the case of Geneva, to a greater degree than in that of Fontana, the report says, there are portions of the states of Texas, Oklahoma, Kansas, Nebraska and North and South Dakota (Prairie section) which may also be considered potential markets.

Competition with Geneva in the Pacific Coast section, it is declared, will be not only from other western plants, but also from plants located on or near the eastern seaboard that have a greater diversity of products and can ship by water to Pacific ports at comparatively low rates. In the Rocky Mountain section, the report says that Colorado Fuel & Iron Corp. will be the principal competitor. In the Prairie section it is declared that Geneva would be competing with CF&I and with companies whose plants are located in the central and southern part of the United States.

Estimated postwar markets available to Geneva in the Pacific and Rocky Mountain sections are 3,014,700 net tons. A portion of the total Prairie section consumption of about 2,000,000 tons, it was stated, may be considered as probably available. Estimated postwar exports were given as 465,000 tons.

Products listed for these markets are heavy structurals and piling; rails, bars and rods; sheets, strip pipe and tubes, tin plate, plain wire, semi-finished and other tonnage. The largest markets in the Pacific and Rocky Mountain sections include pipe and tubes, 506,100 tons; tinplate, 484,100 tons; bars and rods, 409,800 tons; sheets, 376,300 tons; rails, 278,900 tons; plates, 230,400 tons and structurals, 179,300 tons.

The report says that to indicate the amounts and varieties of products that could be manufactured at Geneva after conversion without creating a surplus of these beyond the normal demand of the western states, the future plans for Fontana must be taken into consideration. According to a recent agreement between RFC and the Kaiser Co., it is pointed out, the near future capacity of Fontana in net tons, annually, will be 520,000 tons, divided as follows: Plates, 150,000 tons; strip, 20,000 tons; pipe, 120,000 tons; structurals, 100,000 tons; bars, 90,000 tons; billets, 40,000 tons.

After increasing prewar capacities by wartime additions and adjusting for the post-conversion schedule at Fontana, the report gives what it says should be the situation, prior to conversion of Geneva. The rolling capacities of western mills after Fontana is converted are given as 3,317,000 tons, the products being plates, 875,000 tons; bars and rods, 750,000 tons; structurals, 555,500 tons; rails, 347,000 tons; semi-finished, 228,000 tons; pipe and tubes, 144,300 tons; plain wire, 121,000 tons; sheets, 120,000 tons; strip, 26,500 tons; other products, 150,000 tons.

Deficiencies with respect to estimated postwar consumptions are given as follows: strip, 23,500 tons; sheets, 256,300 tons; tinplate, 484,100 tons; pipe and tubes, 361,800 tons.

Estimated surpluses are: Plates, 644,600 tons; bars and rods 340,200 tons; plain wire, 29,100 tons; rails, 68,100 tons; structurals, 376,200 tons; semi-finished, 206,600 tons. Total ingot requirements are estimated at 4,050,000 tons compared with a total ingot capacity of 4,667,000 tons, leaving an excess ingot capacity of 617,000 tons.

It is pointed out that Geneva's present capacities are 700,000 tons of plates and 200,000 tons of structurals, amounting to more than double the total western peacetime requirements of plates and somewhat more than the total requirements of structurals.

Moreover, the report points out, these peacetime requirements can be supplied by other western plants and Geneva can secure only part of such tonnage.

"On the other hand," says the report, "even after conversion of Fontana there will be a deficit in western production of 1,362,200 net tons annually of other products, an amount which could absorb all of Geneva's ingot capacity. Geneva would not secure all of this tonnage, even if properly equipped to produce it, but if its rolling mill facilities could be adapted to the manufacture of strip, sheets, tin plate and tubing, a substantial part of Geneva's ingot capacity could be utilized in a way that would not seriously curtail the output of other western producers."

Exploring selling prices, the report states that the controlling feature in price setting for Pacific Coast markets in the past has been the quoted base prices at the larger producing centers. Pacific Coast prices have, for the most part, it is pointed out, been equal to Pittsburgh prices, plus $10 to $15 per ton, these additions representing roughly transportation charges on the various products from the principal sources of supply. Western consumers, it is declared, hope that these differentials may eventually be reduced through operation of integrated steel plants in the West because the method of pricing is modified occasionally when there are producing plants of sufficient size to be competitive in the consuming areas.

This, it is pointed out, does not mean that prices in the West will be lower in the near future than they are at present. Increases in labor rates and costs of materials and supplies during the war period have not been compensated by increases in prices of steel products either in the East or the West, the report declares, and higher prices generally are to be expected.

"Steel, of couse, will be sold at times at less than quoted market prices," it is pointed out. "The effects of final competitive bidding cannot be measured but it can be assumed that producers that have until now held the western markets will use every legal means to retain them. Quality, means of transportation, deliveries, business relationship between producers and consumers, and other factors, will enter into the determination of final prices. In some cases, however, these conditions will favor the new suppliers as much, if not more, than they do the present ones."

The report makes preliminary estimates for the selection of products, choosing for the most part those that have been listed in the foregoing paragraphs, quoting June 1, 1945, prices at Pittsburgh and West Coast ports, except for tinplate which is arbitrarily taken at 6 pct less than base, plus freight. Certain other prices on which western prices are not published are estimated by the eastern base-plus-freight method. These, the report explains, are also the basic prices that will be used in making the final estimates of profitability. The West Coast prices quoted show a spread of $10 to $15 or higher over the Pittsburgh quotations.

WILLING: *Although Henry Kaiser would like to have the Geneva Steel plant, whether he gets it or not, he still insists that it should be run for the benefit of the West Coast and not closed down.*

The report directs attention to the recent adverse decision of the United States Supreme Court relative to the use of basing point price system in the sale of glucose and says it may eventually affect the pricing method in the steel industry. It is pointed out that the steel industry quotes on a delivered price basis and that the usually suggested alternative is f.o.b. mill. The f.o.b. mill method of pricing, it is stated, might alter considerably the present structure of steel prices in the western area.

Taking up the subject of freight rates, the report explains that until recently the Geneva plant produced steel only for the Government and the freight rates allowed were much less than the published tariffs. The consulting engineers, however, were instructed by RFC to use tentative rates from Geneva. These rates in net tons of finished products are $8 to San Francisco and Los Angeles; $10 to Seattle, Wash., and Denver, Colo.; $9.50 to Portland, Ore., and $2 to Salt Lake City, Utah. These rates are then compared with all rail and rail and water rates from other steel producing points in the west, middle west, south and east, and except for those from Fontana and the Sparrows Point, Md.,—Seattle water rates are lower than from other points.

The report presents four hypothetical production schedules for Geneva and recommended the following one:

	Net Tons per Year
Plates	100,000
Hot rolled strip sheets	75,000
Tinplate	280,000
Seamless pipe	150,000
Rerolling and forging billets	30,000
TOTAL	635,000

Structurals were not included in the Geneva schedule, the report says, because these have been utilized to fill out the schedule for Fontana and because they are already produced at CF&I. The structural mill at Geneva, it is pointed out, will be utilized for approximately four-fifths of its time in rolling the blanks for seamless mill and billets but will also have capacity to produce up to 40,000 tons of structurals, and more, of course, when the demand for pipe is less than the schedule.

The comparatively low profits in structurals, it is stated, would not appear to warrant shipping these very far and the market for them near to Geneva is thin. It is contemplated, however, that some structurals will be rolled as a reserve tonnage to protect operations of the plant. It was suggested that certain other products such as railroad supplies might ultimately be produced at Geneva. The schedule, it is declared, would not encroach upon the operating of existing plants, except in the manufacture of billets.

Rates of utilization based on annual capacity in net tons of the several departments at Geneva were estimated as follows:

	Capacity	*Output*	*Pct*
Coke plant	1,006,000	480,000	48
Blast furnaces	1,149,150	600,000	52
Steel plant	1,300,000	890,000	69
Blooming Mill	1,250,000	750,000	60
Plate Mill	700,000	535,000	75
Structural Mill	250,000	200,000	80

The cost of converting Geneva to the suggested schedule is estimated at $39,460,000, broken down as follows:

Conversion of plate mill	$ 5,722,000
Tinplate plant	17,918,000
Seamless tube mill	13,035,000
Electric weld pipe mill (alternate, $9,014,000)	
Tar distilling plant	500,000
Coke handling facilities	250,000
Sintering plant improvements	100,000

It is proposed to convert the 132 in. plate mill into a plate and strip mill to produce annually 100,000 tons of sheared and universal plates; 75,000 tons of strip for the production of sheets; 163,000 tons of skelp coils for welded pipe and 326,000 tons of strip coils for the production of tin plate, a total of 664,000 tons.

The four existing 132 in. stands would be converted to 80 in. stands and two additional 4-high 80 in. wide stands would be installed, thus providing a 6-stand 80 in. wide strip and light plate finishing mill with a new flying shear following the last stand.

All of the facilities proposed for producing tin plate with an annual capacity of 280,000 tons, would be new except certain portions of the existing plate mill buildings in which some of the cold strip and tin plate producing equipment would be located. Of the propesed output 200,000 tons would be hot dip and 80,000 tons would be electrolytic tin plate. Distribution of tinning between the hot dip and electrolytic processes would be subject to revision after negotiations with the companies who might buy or lease the plant.

The proposed seamless tube mill would have capacity for the production of 150,000 tons annually, average, of pipe and tubes in diameters from 2⅜ in. to 8⅝ in. Round bars or billets would be rolled on the rail and structural mill. These are cut at the tube mill into blanks from which seamless pipe and tubes are made. As an alternate to the seamless tube mill, and one requiring a smaller capacity, provision is made for an electric weld pipe mill to produce about the same annual output and ranges in sizes of pipes and tubes. Skelp for making electric weld pipe would be rolled on the hot strip mill and delivered to the pipe mill, mostly in the form of coils.

In its study on raw materials, the report says that the coal fields and iron ore deposits in Utah are the only proven supplies of these materials that are near enough to Geneva and large enough to serve as a reserve for a plant of its size. The coal reserves are said to be ample, but not entirely satisfactory as to quality; the ore reserves, of good quality but not entirely adequate.

Production of the Horse Canyon Coal mine should be ample for postwar operations at Geneva. The coal in the mine for the most part is property of the United States Government or the State of Utah. During 1945, the cost of mining this coal, at less than $3 per ton, the report says, has compared favorably with mining costs in other localities. The mine is 130 miles from Geneva and the coal is hauled to the plant on the line of the Denver & Rio Grande railroad. The present freight rate of $1.39 per ton, it is stated, makes transportation costs somewhat higher than for Birmingham, Ala., and Ohio river districts which are most favored in this respect, but considerably lower than for most steel manufacturing centers, such as Youngstown, Cleveland and Chicago.

It is pointed out that the Utah coals, being unusually high in volatile and oxygen content, are of borderline coking quality and, so far, efforts to produce a satisfactory coke for the Geneva plant without mixing with other coals have not been successful. In estimating future operating costs and earning potentialities, the report says that it is assumed that the quality of the coke will be improved by the addition of low volatile coal and such amounts of pitch as may be made at Geneva.

With respect to ore supplies, the report says that it seems reasonable to expect that satisfactory arrangements can be made to protect the operations at Geneva with additional leases or purchases from the present owners of Iron Mountain properties in southwestern Utah. Under the present contract arrangement with the Columbia Mining Co., it is explained, the cost per ton of ore from the Iron Mountain district has averaged about $2 per ton, including transportation charges of $1.38. Containing slightly more than 50 pct of Fe, the unit cost of metallics at about 4¢ is said to compare very favorably with that of any other plant in the United States. If the annual supplies of scrap in prewar years continues in like amounts, it is stated, they should be sufficient for operation of the now existing west coast steel plants at capacity rates of operation, provided no scrap is exported. It is added that scrap from Utah, Nevada, Idaho and parts of Arizona, Oregon, Montana and Wyoming should be available to Geneva at prices generally comparable to those at Pacific Coast plants.

It is stated that 20 pct of the coke produced in the coke ovens has been unfit for use in the blast furnaces while in good practice such losses

STAMPING MACHINE: *During the war, this huge stamping machine at the Firestone Steel Products Co. produced shatterproof oxygen cylinders for high altitude flying. It is now used for making stainless steel beverage containers.*

should not exceed 10 pct. While some relief was said to have been found through changes in the coke handling system and there is still room for improvement in this direction, it is pointed out that only a tougher, stronger coke will reduce losses from breakage and abrasion to a normal amount. Of greater importance, however, the report says, is the detrimental effect of the soft coke upon blast furnace operations. The Geneva furnaces, it is stated, have been obliged to use about one third more coke per ton of iron produced than should be necessary with stronger coke of equivalent fuel value.

In view of developments in the blending of Horse Canyon coal with low volatile coal, the report says that if the efforts to use 100 pct Utah coal are not successful, satisfactory blast furnace operations can be obtained by blending from 10 pct to 15 pct low volatiles into the coking mixture.

"The fact that the Geneva furnaces are larger and probably require stronger coke than at Provo, may make this alternative desirable, if not imperative," the report says.

Open hearth conversion charges, taking January, February and March, 1945, as indicative, at $7.15 per ton are said to be about $1 higher than at well equipped older plants of comparable size. Maintenance charges, particularly, it is said, are out of line for a new plant that should not be continuing. Other items of cost, above listed as being high by comparison, are transportation, general services and mold and stool expense. Although limited in their operations by the amount of steel provided, the report says that the performance of the rolling mill department seems to have been highly satisfactory.

Estimated future manufacturing costs per ton at Geneva, based on full operation, are given as follows: Furnace coke, $6.98; basic hot metal, $12; carbon steel ingots, $21; slabs, $24.33; billets, $27.82; hot rolled strip coils, $28.80; plates, $32; sheared strip, $32.60; hot dip tinplate, $70; electrolytic tinplate, $65; seamless pipe, $65.

Tables are presented in the report on estimated annual potential gross operating earnings before depreciation, amortization, interest and income taxes. The potential gross operating earnings based on efficient operation of improved plant at 100 pct are estimated at $16,502,275, and at 60 pct they are estimated at $6,951,087. At 70 pct the estimate is $10,000,000.

Asks for Leasing of Scrambled Plant Facilities on a Rental Basis

Washington

• • • Representing the only producer to testify in regard to the 266 scrambled facility steel projects, costing $561,000,000, S. E. Bramer, president, Copperweld Steel Co., asked the Senate Military Affairs Surplus Property subcommittee to consider leasing the facilities in the Copperweld Plants, valued at more than $11,000,000, on a long-term rental basis for a minimum of 20 yr.

Senator Joseph C. O'Mahoney, Chairman of the Subcommittee, favored this method of handling scrambled facilities, particularly after RFC Director Sam Husbands told the senator that this method has been RFC policy for some time. Pointing out that while no steel facilities had been rented up to this time, 158 plants, in other lines, valued at $860,000,000 had already been rented. It is RFC's policy to make agreements for 5 yr, with a maximum of 15 yr, on the basis that the plants should be sold within that period. Rentals are scaled by RFC predicted on sales.

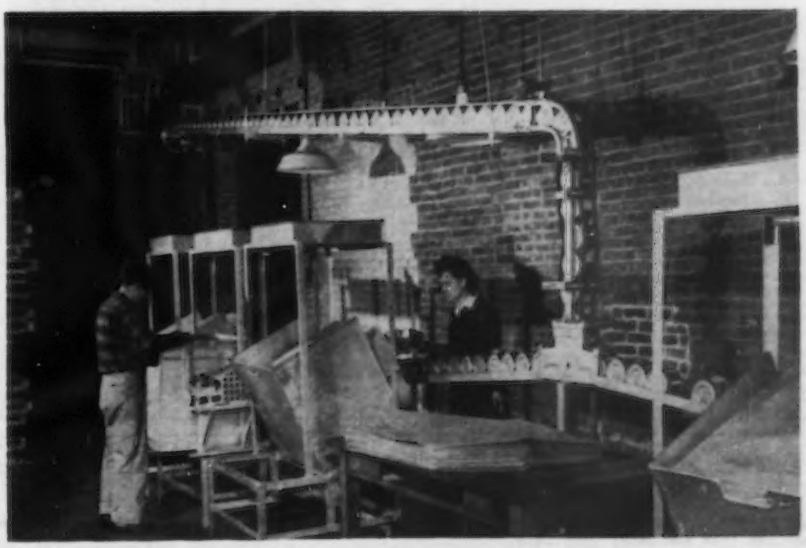
While acknowledging that electric furnace capacity had increased 400 pct during the war and that his company was now the fourth largest producer of electric furnace steel, Mr. Bramer said that Copperweld felt that the excess government capacity could be fully utilized by vigorous sales efforts and was willing to take the risk if proper rentals based on earnings could be arrived at. He added that Copperweld hoped to be able to produce certain types of steel in the electric furnace as cheaply as they are now produced in the open hearth.

Closing the hearings, former Congressman John M. Costello, now Washington representative for the Los Angeles Chamber of Commerce, presented a statement on behalf of the steel committee of the Western States Council. Mr. Costello appeared for Alden Roach, president of Consolidated Steel Corp., Ltd., who could not be present.

The statement reiterated the oft-repeated council's three-point position: (1) Competitive bidding for Geneva; (2) revamping of the RFC loan to Fontana; and (3) elimination of the so-called "phantom freight" charges on steel produced on the West Coast.

Mr. Costello was closely questioned by a representative of the Federal Trade Commission in regard to whether the council was aware of the effect of the recent Supreme Court decision in the corn products case on the "Phantom Freight" charges. Since Mr. Costello was appearing as a substitute witness he said that he was not prepared to answer fully.

CANS COMING: With restrictions off, American Can Co.'s plants at Jersey *City, N. J., are rushing production of treated blackplate vacuum cans for coffee. About* 700,000,000 *are expected to be produced by the company within the next* 12 *months.*



Differing Views Enliven Geneva Steel Disposal Hearing

Washington

• • • **Hearings on disposal** of government-owned steel plants before the Senate Military Affairs surplus property subcommittee last week brought but little light on what the committee may recommend.

With the $190 million Geneva steel plant the focal point of discussion, which was sharp at times, the numerous witnesses from both government and industry aired differing views as did committee members themselves. An outstanding highlight of the proceedings was the comment on an engineering report prepared for RFC by the Arthur G. McKee Co., whose estimate of $121 million as the cost of a plant equivalent to Geneva was attacked as being inflated by both President E. Perry Holder of the Colorado Fuel & Iron Co., and Henry Kaiser, who have indicated interest in Geneva. Also the National Steel Corp., through Vice-President Thomas E. Millsop, said it was interested in obtaining the plant but not at the price suggested.

Roger Blough, general counsel for the United States Steel Corp., disclaimed any interest in acquiring the Geneva plant. He told the committee that even if acquired, finishing facilities would be located in the San Francisco area and Geneva would be used only for rolling semi-finished products. Mr. Blough's remarks reaffirmed the position of U. S. Steel announced some time ago by President Benjamin F. Fairless.

Outlining factors which dissuaded the corporation from acquiring Geneva and caused its withdrawal from negotiations last August, Mr. Blough stated that the distance from the far western market put Geneva at a disadvantage both from the standpoint of greater shipping costs and adverse marketing potentialities. Continued efforts by the Federal Trade Commission to enforce f.o.b. mill prices would have a harmful effect on Geneva, Mr. Blough declared.

Sam Husbands, RFC director, summarized the financial prospects of Geneva as determined by the McKee Co. The replacement cost of $121 million stated in the survey, Mr. Husbards stated, does not represent the appraisal value. Profits are estimated

AMERICAN IRON AND STEEL INSTITUTE
CAPACITY, PRODUCTION AND SHIPMENTS
Period SEPTEMBER - 1945

Steel Products	Number of companies	Items	Maximum Annual Potential Capacity Net Tons	Current Month: Production: Net Tons	Current Month: Production: Per cent of capacity	Current Month: Shipments (Net Tons): Total	Current Month: Shipments (Net Tons): To members of the industry for conversion into further finished products	To Date This Year: Production: Net Tons	To Date This Year: Production: Per cent of capacity	To Date This Year: Shipments (Net Tons): Total	To Date This Year: Shipments (Net Tons): To members of the industry for conversion into further finished products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	51	1	xxxx	xxxx	xxx	329,254	174,186	xxxx	xxx	5,904,366	1,689,892
Structural shapes (heavy)	11	2	9,580,550	282,571	37.7	272,165	xxxx	2,577,975	38.3	2,570,758	xxxx
Steel piling	4	3		14,141		13,987	xxxx	168,495		171,249	xxxx
Plates (sheared and universal)	27	4	17,841,320	448,095	30.6	424,804	38,896	5,959,235	44.7	5,815,371	443,292
Skelp	6	5	xxxx	xxxx	xxx	64,151	28,243	xxxx	xxx	579,621	300,538
Rails—Standard (over 60 lbs.)	4	6	3,669,000	203,794	67.7	206,356	xxxx	1,682,023	61.3	1,653,831	xxxx
—All other	5	7	512,000	10,106	24.0	14,066	xxxx	121,985	31.9	128,775	xxxx
Splice bars and tie plates	12	8	1,745,960	62,232	43.4	65,153	xxxx	567,515	43.5	587,464	xxxx
Track spikes	10	9	349,400	13,290	46.3	13,845	xxxx	115,541	44.2	120,144	xxxx
Hot Rolled Bars—Carbon	38	10	xxxx	623,155	xxx	514,063	79,820	6,389,328	xxx	5,052,173	793,497
—Reinforcing—New billet	13	11	xxxx	65,696	xxx	68,464	xxxx	498,804	xxx	508,862	xxxx
—Rerolled	14	12	xxxx	6,785	xxx	6,129	xxxx	53,091	xxx	61,422	xxxx
—Alloy	24	13	xxxx	160,091	xxx	120,181	13,070	2,128,528	xxx	1,545,679	185,319
—Total	46	14	22,381,700	855,727	46.6	708,837	92,890	9,071,751	54.2	7,168,136	978,816
Cold Finished Bars—Carbon	23	15	xxxx	100,225	xxx	96,437	xxxx	1,288,664	xxx	1,280,778	xxxx
—Alloy	25	16	xxxx	20,524	xxx	16,321	xxxx	304,013	xxx	272,440	xxxx
—Total	32	17	3,015,910	120,749	48.8	112,758	xxxx	1,592,677	70.6	1,553,218	xxxx
Tool steel bars	17	18	273,010	7,337	33.6	7,559	xxxx	97,838	47.9	96,979	xxxx
Pipe and Tubes—Butt weld	16	19	2,232,520	130,265	71.1	122,165	xxxx	1,162,112	69.6	1,132,790	xxxx
—Lap weld	9	20	830,200	36,840	54.1	37,466	xxxx	394,197	63.5	406,767	xxxx
—Electric weld	11	21	1,570,900	74,793	58.0	65,112	xxxx	768,244	65.4	682,313	xxxx
—Seamless	16	22	3,377,700	195,997	70.0	159,587	xxxx	2,212,414	87.6	1,757,280	xxxx
—Conduit (cap. & prod. incl. above)	7	23	xxxx	xxxx	xxx	6,919	xxxx	xxxx	xxx	63,868	xxxx
—Mech. tubing (cap. & prod. incl. above)	11	24	xxxx	xxxx	xxx	37,588	xxxx	xxxx	xxx	539,305	xxxx
Wire rods	27	25	7,266,670	332,470	55.7	102,505	32,488	3,356,754	61.8	982,432	337,356
Wire—Drawn	41	26	5,664,690	246,880	53.1	139,739	8,363	2,613,899	61.7	1,553,920	88,354
—Nails and staples	19	27	1,253,360	45,840	44.5	47,248	xxxx	442,841	47.2	449,074	xxxx
—Barbed and twisted	15	28	539,610	17,826	40.2	18,208	xxxx	174,910	43.3	175,554	xxxx
—Woven wire fence	16	29	1,113,860	29,465	32.2	29,754	xxxx	270,304	32.4	269,440	xxxx
—Bale ties	12	30	149,700	5,827	47.4	6,571	xxxx	55,174	49.3	61,795	xxxx
Black Plate—Ordinary	9	31	xxxx	xxxx	xxx	50,845	167	xxxx	xxx	388,573	3,486
—Chemically treated	8	32	465,000	8,839	23.2	7,763	xxxx	84,610	24.3	77,299	xxxx
Tin and Terne Plate—Hot dipped	10	33	3,793,850	158,899	51.0	150,349	xxxx	1,543,877	54.4	1,628,701	xxxx
—Electrolytic	10	34	2,231,850	71,811	39.2	62,762	xxxx	659,471	59.5	664,580	xxxx
Sheets—Hot rolled	30	35	19,197,320	1,115,521	70.8	517,337	41,627	10,125,859	70.5	5,079,771	353,251
—Cold rolled	12	36	7,131,460	408,425	69.8	237,025	xxxx	3,413,176	64.0	1,977,847	xxxx
—Galvanized	16	37	2,915,130	128,780	53.8	124,921	xxxx	1,290,234	59.2	1,291,128	xxxx
Strip—Hot rolled	24	38	7,055,390	195,806	33.8	113,819	22,085	1,988,312	37.7	1,225,853	207,008
—Cold rolled	35	39	3,119,850	98,084	38.3	84,359	xxxx	1,027,519	44.0	958,824	xxxx
Wheels (car, rolled steel)	5	40	319,400	22,050	84.1	22,259	xxxx	218,515	91.5	219,001	xxxx
Axles	6	41	408,170	12,048	36.0	11,544	xxxx	110,522	36.2	112,626	xxxx
All other	5	42	190,490	3,132	20.0	2,563	xxxx	32,211	24.7	32,027	xxxx
TOTAL STEEL PRODUCTS	152	43	xxxx	xxxx	xxx	4,391,143	435,945	xxxx	xxx	48,080,680	4,401,933
Effective steel finishing capacity	152	44	67,310,000	xxxx	xxx	xxxx	xxxx	xxxx	xxx	xxxx	xxxx
Percent of shipments to effective finishing capacity	152	45	xxxx	xxxx	xxx	71.6 %	xxxx	xxxx	xxx	86.8%	xxxx

During 1944 the companies included above represented 99.0% of the total output of finished rolled steel products as reported to American Iron and Steel Institute.

at $16 million per annum at 100 pct capacity operation or $10 million at 60 pct operation. The cost of improvements to be paid by a prospective purchaser are set at around $39 million. This is approximately half of the amount estimated as required in the offer to lease submitted by CF&I.

In the discussion pertaining to the projected expansion of United States Steel Corp. tinplate facilities at Pittsburg, Calif., Mr. Holder declared that, "all factors being equal, tinplate can be produced at Geneva just as cheaply as a Sparrows Point, Md." He also offered a long range prediction that freight rates from Geneva will go down whereas water transportation rates through the Panama Canal will increase in the future.

Mr. Holder declared that Geneva's prime market area is the Rocky Mountain region, and that markets will develop around Geneva. He also expressed the opinion that Utah's ore deposit ranks second only to the Mesabi range. The operation, he said, must be tied up with the development of materials within that area for use in the plant. Only CF&I and U. S. Steel were said to have the resources, know-how and sales organization to do the job. Mr. Holder said that Geneva can be operated in the immediate future but not profitably under the present property valuation. Estimating that it may not be operated profitably for 15 years, he said CF&I would be willing to operate it for that period without a profit, but not at a loss, and will buy or lease the plant. He disagreed with the McKee report on $70 a ton cost of making tinplate, on ingot costs, and on freight rates of $8 a ton. He said that based on earning power no one could pay the McKee replacement estimate for the plant. He added that the government would be well taken care of if it sold on the basis of the McKee report.

Mr. Millsop raised the point that while it was admirable for the committee to wish for all the production possible, the other factor of consumption was of paramount importance. He asked for proper appraisal and then outright sale to private enterprise. Replying to a question by Senator Joseph C. O'Mahoney, D., Wyo., chairman of the subcommittee, Mr. Millsop said that National was interested in buying Geneva but not at the price now being discussed by the government.

Mr. Kaiser suggested that Geneva be sold to the highest bidder, the bids to be submitted and opened in the usual manner, subject to the government's right to reject. Mr. Kaiser also stated that the facilities could be used in production of seamless pipe, car axles and other miscellaneous steel products.

In answer to a question by Senator Chapman Revercomb, R., W. Va., concerning the proposed western steel syndicate, Mr. Kaiser replied that the obstacle which confronted them and which could not be overcome was that full war costs would have to be paid in acquiring the facilities involved.

Mr. Kaiser characterized the McKee report as more of a "guesstimate" than an estimate, and said he would be interested in a lease, but is not sure estimates can be gotten together on capital costs. He said that one report (referring to a report made for Mr. Kaiser by H. A. Brassert) seems to be in the best interests of the buyer while the McKee report was said to favor the seller.

Mr. Brassert testified that his report placed the present physical value of Geneva at $47,640,000 and $42,850,000 as the cost of additional equipment, with $90,490,000 the value of the expanded plant. His economic valuation of the expanded plant is $58,400,000. At present the plant, Mr. Brassert said, has practically no economic value.

Mr. Kaiser declared that the steel industry should be decentralized and that the plant could become a great armament center. Senator O'Mahoney interjected that there is no future in armament production. Mr. Holder pointed out that Geneva steel could be used in construction of the Alaska highway. CF&I, Geneva and Fontana,

AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1945

Based on Reports by Companies which in 1944 made 97.9% of the Open Hearth, 100% of the Bessemer and 86.7% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,468,815	90.5	379,062	76.0	358,346	77.3	7,206,223	88.8	1,626,687	4.43
February	5,967,842	92.4	347,227	77.1	339,520	81.1	6,654,589	90.8	1,663,647	4.00
March	6,927,377	96.9	398,351	79.8	382,237	82.4	7,707,965	95.0	1,739,947	4.43
1st Quarter	*19,364,034*	*93.3*	*1,124,640*	*77.6*	*1,080,103*	*80.2*	*21,568,777*	*91.6*	*1,677,199*	*12.86*
April	6,541,097	94.4	372,952	77.2	377,877	84.1	7,291,926	92.8	1,699,750	4.29
May	6,663,577	93.2	402,100	80.6	386,075	83.3	7,451,752	91.8	1,682,111	4.43
June	6,129,266	88.5	379,807	78.6	333,217	74.2	6,842,290	87.1	1,594,939	4.29
2nd Quarter	*19,333,940*	*92.1*	*1,154,859*	*78.8*	*1,097,169*	*80.6*	*21,585,968*	*90.6*	*1,659,183*	*13.01*
1st 6 Months	*38,697,974*	*92.7*	*2,279,499*	*78.2*	*2,177,272*	*80.4*	*43,154,745*	*91.1*	*1,668,139*	*25.87*
July	6,318,463	88.6	381,832	76.7	286,713	61.9	6,987,008	86.3	1,580,771	4.42
August	5,171,925	72.3	347,088	69.5	217,363	46.9	5,736,376	70.7	1,294,893	4.43
*September	5,435,358	78.7	352,847	73.2	195,156	43.5	5,983,361	76.3	1,397,982	4.28
* *3rd Quarter*	*16,925,746*	*79.9*	*1,081,767*	*73.1*	*699,232*	*50.9*	*18,706,745*	*77.8*	*1,424,733*	*13.13*
* *9 months*	*55,623,720*	*88.3*	*3,361,266*	*76.5*	*2,876,504*	*70.4*	*61,861,490*	*86.6*	*1,586,192*	*39.00*
† October	5,172,350	72.3	242,177	48.5	205,480	44.3	5,620,007	69.3	1,268,625	4.43
November										4.29
December										4.42
4th Quarter										*13.14*
2nd 6 months										*26.27*
Total										52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,814,350 net tons open hearth, 112,650 net tons Bessemer and 104,640 net tons electric ingots and steel for castings, total 1,831,530 net tons; based on annual capacities as of January 1, 1945 as follows: Open hearth 94,417,990 net tons, Bessemer 5,874,000 net tons, Electric 5,455,990 net tons.

* Revised.
† Preliminary figures, subject to revision.

YEAR 1944

Based on Reports by Companies which in 1944 made 97.9% of the Open Hearth, 100% of the Bessemer and 86.7% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,770,423	97.2	439,551	85.4	382,629	84.4	7,592,603	95.7	1,713,906	4.43
February	6,410,914	98.5	409,781	85.2	373,314	88.1	7,194,009	97.0	1,737,683	4.14
March	6,977,466	100.1	455,368	88.5	393,423	86.8	7,826,257	98.6	1,766,649	4.43
1st Quarter	*20,158,803*	*98.6*	*1,304,700*	*86.4*	*1,149,366*	*86.4*	*22,612,869*	*97.1*	*1,739,451*	*13.00*
April	6,789,422	100.6	437,472	87.8	366,794	83.5	7,593,688	98.8	1,770,090	4.29
May	6,879,253	98.7	437,444	85.0	385,879	85.1	7,702,576	97.1	1,738,730	4.43
June	6,463,049	95.8	419,699	84.2	351,509	80.1	7,234,257	94.1	1,686,307	4.29
2nd Quarter	*20,131,724*	*98.4*	*1,294,615*	*85.6*	*1,104,182*	*82.9*	*22,530,521*	*96.7*	*1,731,785*	*13.01*
1st 6 months	*40,290,527*	*98.5*	*2,599,315*	*86.0*	*2,253,548*	*84.7*	*45,143,390*	*96.9*	*1,735,617*	*26.01*
July	6,743,812	96.6	415,543	80.9	339,032	74.6	7,498,387	94.3	1,696,468	4.42
August	6,715,835	95.9	429,672	83.5	353,406	77.6	7,498,913	94.1	1,692,757	4.43
September	6,501,944	96.1	398,058	80.1	335,109	76.2	7,235,111	94.0	1,690,446	4.28
3rd Quarter	*19,961,591*	*96.2*	*1,243,273*	*81.5*	*1,027,547*	*76.2*	*22,232,411*	*94.1*	*1,693,253*	*13.13*
9 months	*60,252,118*	*97.7*	*3,842,588*	*84.5*	*3,281,095*	*81.8*	*67,375,801*	*96.0*	*1,721,405*	*39.14*
October	6,860,921	98.0	420,105	81.6	339,859	74.7	7,620,885	95.6	1,720,290	4.43
November	6,572,454	97.0	403,908	81.0	302,357	68.6	7,278,719	94.3	1,696,671	4.29
December	6,678,460	95.6	373,322	72.7	314,388	69.2	7,366,170	92.6	1,666,554	4.42
4th Quarter	*20,111,835*	*96.9*	*1,197,335*	*78.4*	*956,604*	*70.8*	*22,265,774*	*94.2*	*1,694,503*	*13.14*
2nd 6 months	*40,073,426*	*96.5*	*2,440,608*	*80.0*	*1,984,151*	*73.5*	*44,498,185*	*94.2*	*1,693,878*	*26.27*
Total	80,363,953	97.5	5,039,923	83.0	4,237,699	79.0	89,641,575	95.5	1,714,644	52.28

Note—The percentages of capacity operated are calculated on weekly capacities of 1,372,755 net tons open hearth, 116,182 net tons Bessemer and 102,350 net tons electric ingots and steel for castings, total 1,791,287 net tons; based on annual capacities as of Jan. 1, 1944 as follows: Open hearth 82,323,610 net tons, Bessemer 6,074,000 net tons, Electric 5,330,880 net tons. Beginning July 1, 1944, the percentages of capacity operated are calculated on weekly capacities of 1,360,042 net tons open hearth, 116,182 net tons Bessemer and 102,797 net tons electric ingots and steel for castings, total 1,798,981 net tons; based on annual capacities as follows: Open hearth 82,694,990 net tons, Bessemer 6,074,000 net tons, Electric 5,372,190 net tons.

operating at a "reasonable" capacity would produce less than 5 pct of the total present capacity, according to Mr. Holder.

Discussing CF&I's offer, Mr. Symington said it was unfair to the government and that he believes the government can get a better deal by waiting than by accepting the present CF&I offer.

Mr. Holder, in an effort to correct what he termed an erroneous impression apparently conveyed to the public that his company's offer was entirely inadequate, pointed out that the offer would yield to the government a return of some $7.2 million which, when added to estimated upkeep costs required to maintain Geneva in stand-by condition, would bring the total up to around $9 million.

However, W. A. Hauck, RFC steel specialist, took exception to the adequacy of the CF&I proposal. He pointed out that the return to the government based on an annual rental of $558,000 would be only .343 pct.

The McKee figure, Mr. Holder pointed out, provides for only a 40 pct write-off whereas some $728 million worth of steel facilities covered by certificates of necessity have been written off 100 pct for tax purposes. Mr. Hauck doubted that the percentage was more than 50 pct on an industry-wide basis with the maximum around 80 pct. He said that RFC favored outright sales of surplus plants and agreed that a lease for five years would present considerable drawbacks.

Mr. Kaiser informed the committee that if the fixed charges for which the Fontana plant is now bound are to be the pattern for Geneva, it would be unsound to submit a bid on the Geneva plant. He also suggested that the proposed Geneva valuation formula be applied to the Fontana plant in order to establish competitive rates. This formula was contained in the SPA report and called for a price based on prospective earnings.

Mr. Hauck admitted that something had to be done in the way of compromising the loan agreement if the committee saw fit to recommend that such action be taken. However, he emphasized that the final decision would rest with the RFC directors whom he could not commit. This was the first time that Fontana entered the picture, particularly as a disposal problem.

Brig. Gen. Hauserman speaking for Secretary of War Patterson stated that the War Department would like to see surplus steel plants disposed of as going facilities rather than have them scrapped and salvaged. He further stated that the department was not in favor of retaining them in stand-by condition.

When Chairman O'Mahoney asked those representatives who considered themselves as being from "small" steel business to arise, five men rose and identified themselves as being from castings and forgings plants. The generally accepted definition of a small business is one employing 200 or less persons. One of the company representatives informed the committee that his plant employed 2200.

James M. Heppenstall, controller of the Birdsboro Steel Foundry, Birdsboro, Pa., outlined the three-fold wartime development of that company. These facilities, however, had operated only at between 30 pct and 40 pct of capacity during the war on account of labor shortages. This plant which was built to produce large castings has a capacity which cannot be economically used in peacetime production, he said, and any move which would bring a new operator into the area would constitute unfair competition due to the possible wage advantage.

Owen P. Dudley, of the Ohio Steel Foundry Co., elaborated on the situation confronting steel castings producers. That segment of industry, he pointed out, is not at all optimistic that the greatly expanded production capacity can be utilized. Compared with the 17 pct expansion of the steel industry as a whole, he said that castings production capacity has been expanded around 200 pct or 100 pct after elimination of special purpose plants.

Castings producers are anticipating losses in the immediate future, he explained, because the backlog of orders is not nearly as large as that now carried by the steel mills. Higher overhead costs are also expected to be a problem and labor shortages will continue for some time due to relatively lower salary rates in the foundries, he stated.

Mr. Dudley urged that in the formulation of disposal policies, castings producers be given special consideration in order to assure continued operation of the plants.

Cyrus Eaton, Cleveland banker and industrialist, advocated decentralization of industry and government retention of the Geneva mill for several years until western markets develop further.

Senator O'Mahoney prefaced a few brief remarks by pointing out that the capital required to reconvert Geneva was so great that private sources are not willing to take the risk involved. The Senator indicated that he would favor using government funds for reconversion if it is necessary to keep Geneva operating. He also saidt hat the steel industry had failed utterly to meet the war demand, and according to Mr. Kaiser was failing to meet peacetime demand.

COMING EVENTS

Nov. 16-17—Forty-Sixth Annual Convention, National Metal Trades Assn., Hotel Cleveland, Cleveland.

Nov. 29-30—Galvanizers Committee Meeting, sponsored by American Zinc Institute, Inc., Netherland Plaza Hotel, Cincinnati.

Dec. 3-4—Fourth Annual Conference, Steel Products Warehouse Assn., Hotel Cleveland, Cleveland.

Dec. 3-5—SAE National Air Transport Engineering Meeting, Edgewater Beach Hotel, Chicago.

Dec. 5-7—Fiftieth Annual Meeting, National Assn. of Manufacturers, Waldorf-Astoria, New York.

Jan. 7-11, 1946—SAE Annual Meeting and Engineering Display, Book-Cadillac Hotel, Detroit.

Jan. 21-23—1946 Convention of Institute of Scrap Iron & Steel, Inc., Congress Hotel, Chicago.

Feb. 4-7—National Meeting, American Welding Society, Hotel Cleveland, Cleveland.

Feb. 4-8—National Metal Exposition, Public Auditorium, Cleveland.

Feb. 4-8—National Metal Congress, Public Auditorium, Cleveland.

Feb. 4-8—American Society for Metals, Statler Hotel, Cleveland.

Feb. 4-8—National Meeting, Iron and Steel and Institute of Metals Div., American Institute of Mining and Metallurgical Engineers, Statler Hotel, Cleveland.

Feb. 6-8—American Industrial Radium and X-ray Society, Hollenden Hotel, Cleveland.

Apr. 3-5—SAE National Aeronautical Meeting, Hotel New Yorker, New York.

Apr. 8-12—ASTE Exposition, Cleveland Public Auditorium, Cleveland.

Apr. 11-13—Spring Congress, Electrochemical Society, Inc., Birmingham, Ala.

Apr. 25-26—Twenty-ninth AIME Annual Open-Hearth Steel and Blast Furnace and Raw Materials Conferences, Chicago.

Senator Revercomb, who has consistently advocated that private financing should take care of the reconversion, suggested that reconversion costs be taken into consideration by RFC in fixing a pricing for the Utah mill.

Mr. Eaton expressed the opinion that Geneva could not be operated profitably under present conditions unless substantial government funds were put into the plant. Presenting elaborate figures to support his contention, he emphasized that under present conditions any steel company could be bought for a song and that in this case Geneva would have to be sold at a huge loss to the government.

This was later countered by Roger Blough, U. S. Steel general counsel, when he cautioned the committee not to compare old steel plants with new ones in fixing a price on Geneva. Mr. Blough also told the committee that the use to which Geneva was to be put would be a determining factor in settling a value on the plant, and that this valuation would vary with possible uses.

Mr. Eaton admitted that his valuation of Fontana at $7.5 million was a ridiculous figure, but he maintained that under present conditions that would be its net worth. The Cleveland banker did not believe that any prospective purchaser would pay more than $15 million for Geneva, at the same time making the necessary improvements and guaranteeing to operate the plant. Backing up some of the previous testimony, Mr. Eaton said that the plant is worth "what someone will pay for it."

SAE Moves to Add Some NE Steels To Standard Listings

New York

• • • **A subcommittee of** the Society of Automotive Engineers—the Iron and Steel Div.—meeting in Detroit, is considering the incorporation of several National Emergency steels into its standard classification of SAE carbon and alloy steels. It is understood that NE 8600 and NE 8700 are two of the triple alloy steels under consideration. The former contains 0.15 to 0.25 molybdenum, the latter 0.20 to 0.30, the balance of the composition of both alloys including nickel 0.40 to 0.70, chromium 0.40 to 0.60.

The American Iron and Steel Institute incorporated these two steels and NE 9800 in its standard steel classification in June when it published a revision of Section 10 of the Steel Products Manual on Hot-rolled Alloy Steels. NE 9800 contains 0.40 to 0.70 nickel, 0.70 to 0.90 chromium, 0.20 to 0.30 molybdenum, 0.70 to 0.90 manganese.

As long ago as January the Technical Committee on Alloy Steel of AISI considered NE 8600 and NE 8700 to be standard steels subject to the prefix "A" or "E" according to the method of production. Nevertheless the listing continued to identfy them as "NE" steels. The proposed action was prompted, according to the Committee's report, by "the large tonnages of those steels which have been and are being produced, their excellent mechanical properties and ultimate performance and their excellent response to various methods of fabrication and heat treatment."

In this connection it is reported that General Motors Corp. has adopted the 8600 and 8700 alloy steels for many of its parts particularly in the Chevrolet and Pontiac lines. Likewise it is known that the American Locomotive Co. has adopted the 9800 type of steel for most heavy locomotive forgings.

The American Steel Warehouse Assn. has recently sent a questionnaire to steel users asking their opinion of the NE steels. About 75 pct of the replies are reported to indicate a preference for the time-honored SAE and AISI steel grades.

U. S. Steel Bases Hoops at Youngstown And Birmingham, Ala.

Pittsburgh

• • • **Carnegie-Illinois** Steel Corp. has announced that Youngstown, Ohio, has been established as a basing point applying to sales of tobacco hogshead and slack barrel hoops.

Tennessee Coal, Iron and Railroad Co., Birmingham, Ala., has announced that Birmingham has been established as a basing point applying to sales of tobacco hogshead and slack barrel hoops.

The prices delivered f.o.b. cars, at the two new basing points in carload lots, are the same as the prices deliver f.o.b. cars, Pittsburgh, Pa., in carload lots.

All delivered prices remain subject to applicable OPA ceilings.

Steel Strapping Urged For Nylon Shipments

• • • The National Retail Dry Goods Association recently advised members to insist that their manufacturers use steel strapping on all shipping containers used for nylon stockings. Apparently there has been considerable difficulty encountered as a result of pilfering and loss of entire shipments. Since the Railway Express Agency handles most of the shipments of nylons, NRDGA arranged a special technique in handling such shipments requiring a signature from each express employee that handles the shipment. The combination of steel strapping on shipping containers and distinctive types of sealing tape is expected to eliminate pilfering of shipments resulting either from accidental or intentional breakage into containers.

New Low Temperature Steel for Gas Plant

New York

• • • **Hydrocarbon Research,** Inc., here is constructing a gasoline synthesis plant in Carthage, Tex. This plant which is expected to be ready early next year employs an intermediate stage in which gasoline manufacturing equipment is required to resist a temperature of minus 300°F. In working out a basis for the most reasonable construction cost the Hydrocarbon Research group working with Lukens Steel Co., Coatesville, Pa. Babcock and Wilcox Tube Co., Beaver Falls, Pa. and the International Nickel Co. Inc., here, have developed an 8½ pct nickel pearlitic steel which retains excellent mechanical characteristics at very low temperatures. This alloy steel has successfully undergone all tests and the sub-zero process plant is ready for construction.

For low temperature applications of this type it has been customary to specify the use of stainless steel.

Midland Reports Loss

Cleveland

• • • **Third quarter** operations of Midland Steel Products Co. resulted in a loss of $54,618 before adjustment of federal taxes, E. J. Kulas, company president, reported.

o o o

NEW BRASS MILL: *Improved design and equipment have been built into the new Bridgeport Brass Co. sheet mill. This view shows the annealing furnaces.*

o o o

Brass Mills Begin Postwar Expansion and Dispersion

New York

By JOHN ANTHONY

o o o

• • • **Connecticut Valley** brass mills, like much of the remainder of United States industry, are in the throes of wage controversy, with the CIO — Mine, Mill and Smelter Worker's Union having voted strikes at the American Brass Co., Scovill Mfg. Co. and Chase Brass & Copper Co. The National Conciliation Service and the War Labor Board are making strenuous efforts to adjust differences in the views of labor and management but no constructive program has yet been worked out.

Meanwhile, the industry is in a most difficult position in attempting to meet reconversion orders which have been piling up during these labor disturbances. The WPB comparison of the time lag between receipt of an order for material and its delivery found brass mill orders to require a lead time of 13 weeks in comparison with 4 weeks normal prewar lead time. It was estimated that the normal time would not be reinstated until next August. However, it would seem that failure to find an early solution of the labor controversy might continue to extend this time.

However, the brass mill industry is optimistic as to future requirements for its products and most mills have conceived and worked out comprehensive plans for plant modernization and expansion, for diversification of products and dispersion of new plant facilities.

The Phelps Dodge Copper Products Corp. has begun construction of a $4.5 million rod, wire and cable plant at Ft. Wayne, Ind., to operate as a new division similar to its present Habirshaw Cable and Wire Div. at Yonkers and Nepperhan, N. Y.; the Bayway Div. at Bayway, N. J.; the Los Angeles Tube Div. at Los Angeles, and the Inca Div. at Fort Wayne.

The new plant which will occupy 31 acres will operate as a separate division, not as an addition to the magnet wire and coil plant of Inca Div. It will be fully equipped for copper rod rolling and for wire drawing, stranding and insulating on a tonnage basis.

Mr. Wylie Brown, president, has said that the new plant is designed to serve the automobile, radio, electrical appliance, aviation and other industries, as well as the public utilities of the Mid-west.

Phelps-Dodge is also operating a new $6 million rod mill at Hammond, Ind. Other DPC expansion operated by the company include an expansion of wiremaking facilities at the Habirshaw Div. in Yonkers, N. Y. and an addition to the Los Angeles Tube Div. plant.

The Bridgeport Brass Co. has provided for the expenditure of nearly $6 million for new buildings, equipment and modernization of production facilities.

Herman W. Steinkraus, president and general manager, in presenting the plan for expansion and modernization said: "There is a large market of pent up buying power of almost everything we can make. The building of new homes will be a tremendous business together with many appliances and conveniences which modern homes require. The automobile market is estimated at four to five million cars per year for a period of five years. Our products must be sold vigorously to a market—ever growing — the prices low enough to attract more buyers and, thereby, to create more jobs."

The expansion plan calls for a modern building now being erected which will produce new items for peacetime consumption.

The five old-type two high rolling mills at the Housatonic Plant are to be replaced by two new, wide four high rolling mills along with additional slitting equipment which will handle wider brass strips. New furnaces and a regrouping of draw benches are planned for the tube mill, while in the rod and wire mill, extrusion facilities will be provided which will permit production beyond war capacity.

The modern war-built Indianapolis ordnance plant of Bridgeport Brass was engineered for 16 million lb of brass monthly but reached maximum production of 35 million lb monthly during the war. Casting production started in April 1942 and shortly afterward the rolling mill and fabricating divisions went into operation. Originally designed to make cartridge cases, in the spring of 1944 the extrusion of 30 and 50 caliber strip

was dropped and a rod manufacturing program substituted. Upon the termination of military contracts it was necessary to shut down the rolling mill and fabricating divisions and this plant is now engaged in melting fired cartridge cases returned from the battlefields.

The modern sheet and strip mill built at Bridgeport in 1938 is said to embody many useful improvements in design and equipment which must fit it as a large and efficient producer of brass and copper sheet and strip for civilian goods.

Among the new products of Bridgeport is the Aerosol dispenser which is finding a ready consumer market. This dispenser releases a fog-like mist of DDT and pyrethrum dispersed in Freon 12 which permeates the room to kill insects but is not harmful to human beings and if used properly will not stain materials.

Promotions and changes in personnel are also a part of the reconversion program. Mead W. Batchelor, vice president in charge of production, has been named to the board of directors. John Dawson, counsel, is now assistant secretary.

Addison Thornton has been named superintendent of the new Tire Stem Depts., while Artemus Pratt will have charge of the Plumbing Depts. The plumbing program calls for the tripling of capacity in a complete line of plumbing supplies, Karl Wunsch has been named to head the departments turning out contract parts such as flashlights, fire extinguishers and like articles for national consumption, while the tremendous task of completing all government requirements and work involved in carrying out cancellation orders of the Army and the Navy along with clearing the plants of all wartime equipment so that peacetime manufacture may proceed as rapidly as possible has been placed upon Ernest H. Morris.

Revere Copper and Brass, Inc. has announced a $4 million expansion program contingent on a substantial increase in prices. C. Donald Dallas, president, said the company planned to extend production facilities at its Rome, N. Y. Mfg. Div. and to enlarge facilities for producing aluminum and magnesium sheet, tubes and forgings.

Revere has carried diversification of product farther than any other factor in the industry and for that very reason looks forward confidently toward the long term postwar marketing problem. Revere proposes to continue its aluminum and magnesium division in production and to reestablish its consumer products market for copper bottom stainless steel pots and pans. Revere also operates a plastics pilot plant.

To Seek Genuine Collective Bargaining

Washington

• • • **Herman W. Steinkraus, president of the Brideport Brass Co., Bridgeport, Conn., a delegate to the President's National Labor-Management Conference has made the following statement: "Collective bargaining is today under way between employers and employees in hundreds of plants and industries throughout the country, as most people know. The truth is that the only breakdown in collective bargaining anywhere is a result of the manner in which it is being practiced, not in its principle or in management's acceptance generally of that principle.**

"Management fully recognizes what the American people and employees in American industry really want, and is striving hard for industrial peace and real collective bargaining throughout America.

"We are here at the call of the President to do a job. That job as we see it is to find and outline ways and means of improving the practices of genuine collective bargaining. Let's get on with the job."

The Chase Brass and Copper Co. whose Euclid Case plant at Cleveland had been expanded by one third during the war by means of a DPC investment of nearly $10 million had also developed a consumer products market for chromium plated brass novelties and giftware before the war which they may be expected to continue.

In the present stage of the labor-management conflict in the industry and the growing backlog of unfilled orders, few brass mills are eager to discuss their expansion or marketing plans for publication.

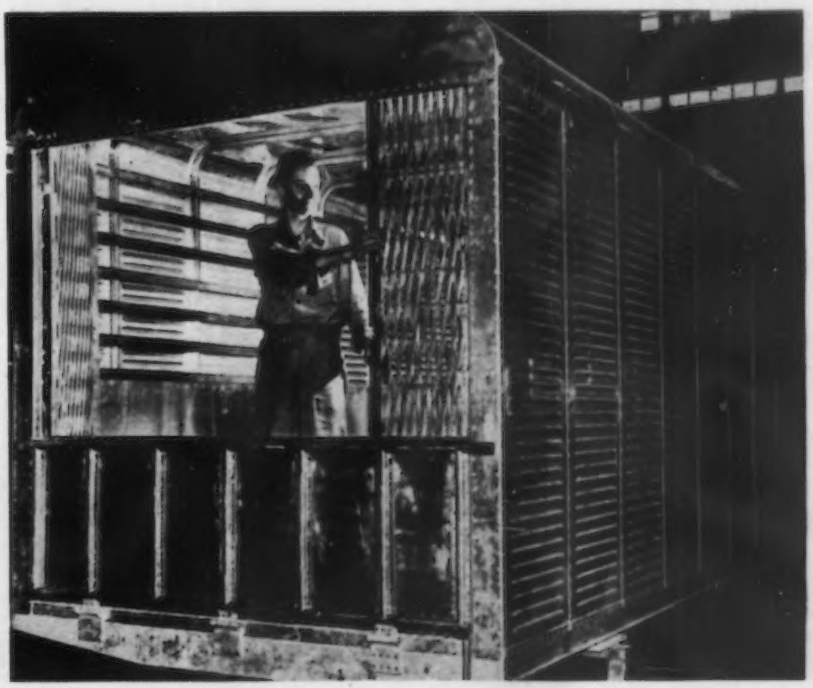
Copper Scrap Reports

Washington

• • • **Consumers of copper scrap** and copper alloy scrap are no longer required to furnish OPA with monthly reports of settlements made for these commodities. The action became effective Nov. 13.

In explanation of its action, OPA said that a recent survey indicated that the industry has become sufficiently acquainted with OPA's operations and requirements and that there is no longer any need for further statistical information. However, OPA said, the record keeping requirements of the regulation have not been changed.

ALUMINUM BODY: *This experimental model of high strength Reynolds aluminum alloy truck and trailer body will soon undergo field tests. The truck body, 16 ft long is reported to save* 1000 *lb deadweight over the conventional body.*



New Rod Permits Machinable Cast Iron Welds

New York

• • • A new welding electrode plant has been established at the Bayonne, N. J., plant of the International Nickel Co., Inc. This plant is now in production of seven types of electrodes for arc welding of nickel and nickel alloys and has now developed a new electrode designated "Ni-Rod" for making machinable welds in cast iron. Gas welding rod and uncoated wire for submerged melt welding are produced at the Huntington Works of the company. Among these arc welding rods is another new product, "132" ac-dc rod for Inconel.

The new Ni-Rod electrode when used as recommended will produce a weld that is said to be machinable under all conditions of deposition. The width and hardness of the heat-affected zone in the parent metal immediately adjacent to the weld depends upon the cooling rate, which in turn is governed by the preheat, the welding amperage and the speed of travel of the electrode. A virtually complete absence of a hard zone in a parent metal can be obtained with a preheat of about 500° F.

The degree of success attained in the welding of cast iron depends to a large extent upon the care used in the preparation of the casting for welding. In addition to the removal of oil, greases, and the like, the casting skin must be removed in the welding area. The surface, or skin, of a casting usually contains sand and other impurities from the mold. Porous or cracked welds can result from welding through this skin.

The Ni-Rod electrode can be used with either dc or ac equipment. When used on dc, reverse polarity is recommended.

In a considerable number of instances, preheating will be found unnecessary. However, the use of a moderate preheat of 150° F to 250° F will be helpful in reducing the cooling rate of the welded casting. A moderate preheat is especially indicated when the casting is well below normal room temperature in cold weather. Somewhat higher preheats as high as 500° F may be desirable when the design, shape and wall thickness of the castings are such that the stresses set up will be rather high, or when the machining requirements are severe.

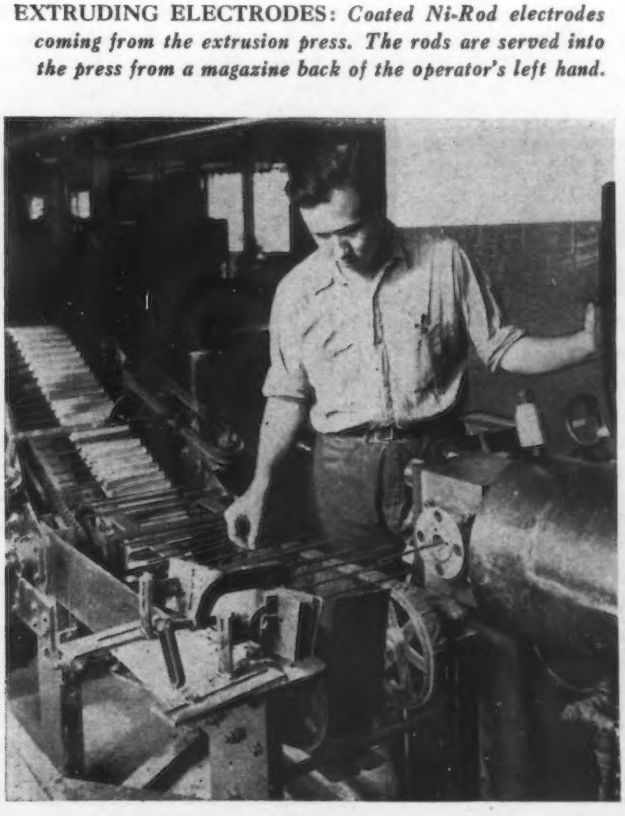
Peening is often useful in reducing the stresses in the welded joint. Peening should be done with numerous moderate blows rather than a few very heavy blows, peening each pass as completed. Too vigorous peening may cause localized failures due to excessive working of the metal.

Frequently castings which have been in service are found to be impregnated with oil. Where possible, heating of the casting to about 700°F for 15 to 30 min will help to eliminate volatile matter, and cut down the evolution of gas during welding. Flat end peening tools are not suited. A ½ in. or ¾ in. diam ball point tool is recommended to obtain proper relief of stress.

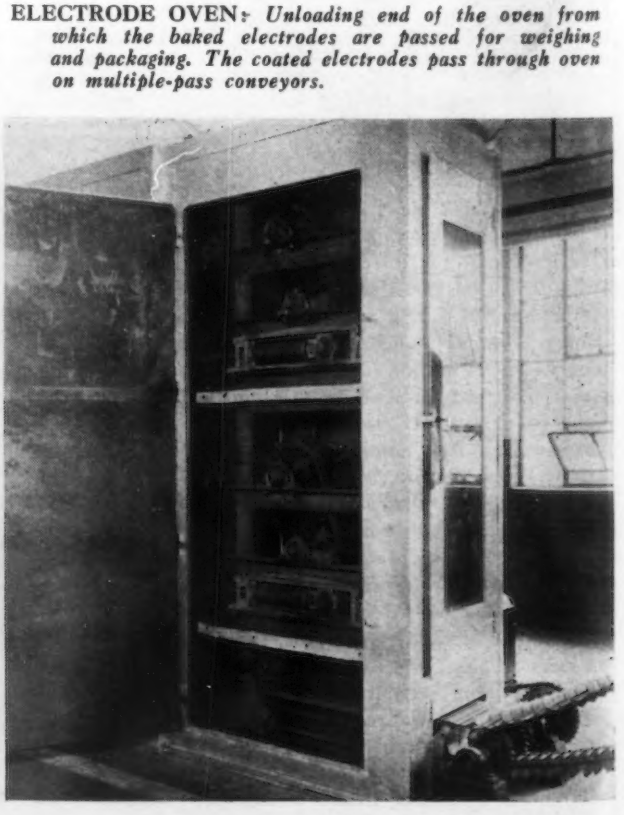
High gas content castings often are encountered. When the nature and size of the casting permits, a brief preliminary treatment at 1000°F will largely eliminate the gas. This, of course, often is not feasible, in which case the first welding passes must serve to drive off most of the gas; subsequent passes should be fairly sound.

The complete list of Inco electrodes

EXTRUDING ELECTRODES: *Coated Ni-Rod electrodes coming from the extrusion press. The rods are served into the press from a magazine back of the operator's left hand.*



ELECTRODE OVEN: *Unloading end of the oven from which the baked electrodes are passed for weighing and packaging. The coated electrodes pass through oven on multiple-pass conveyors.*



and gas welding rods, in addition to Ni-Rod, is shown in the table.

Welding rod production is carried out in automatic equipment, beginning with the mixing of the flux, following through the slug press, loading into the magazine of the flux extrusion press and passage through the new 90-ft. multiple-pass conveyor oven.

Each electrode passes through the oven, back and forth, five times, starting from the top and discharging at the lowest level end. Maximum capacity of the plant is over 1000 lb of electrodes an hour.

J&L to Shut Down No. 4 Seamless Mill

Pittsburgh

• • • **Jones & Laughlin** Steel Corp. has reported that it was discontinuing operations of its No. 4 seamless tube mill at its Aliquippa Works. This means that J&L will be practically out of the boiler tube business, except for relatively small amounts produced on the company's No. 3 seamless mill. The No. 4 mill also produced small diameter seamless tubing, up to 2-in.

The No. 4 seamless mill is a push-bench type mill, the only one of which J&L has in operation. The other seamless mills are of the more conventional types. The No. 4 will be shut down as quickly as present commitments are satisfied, which should be within a short time. Reasons for discontinuing use of the mill are that it is a high cost operation and not nearly as efficient as other seamless mills.

Likewise, J&L anticipates abandoning the production of hot-rolled narrow strip. This commodity, produced mainly at the J&L Otis Works, Cleveland, will be dropped from the company's line because it is not a very profitable item. With regard to cold rolled narrow strip, the capacity of J&L is rather limited, but production will be continued.

Rheem's Earnings Increase

New York

• • • **Rheem Mfg. Co.** for the first nine months of 1945, reports net earnings of $1,426,503, after provision for complete amortization of emergency facilities, taxes and reserve for contingencies.

High Nickel Alloy Welding Rods and Fluxes

MONEL		
Oxyacetylene	"40" Monel gas welding wire	For welding Monel, using *Inco* "1" gas welding and brazing flux
Oxyacetylene	"43" Monel gas welding wire	For welding heavy sections of Monel for acid pickling service —no flux required
Metal arc	"130X" Monel welding electrode dc	For welding Monel; and Monel or nickel to steel
Submerged melt	"50" Monel wire	For welding Monel
NICKEL		
Oxyacetylene	"41" nickel gas welding wire	For welding of pure nickel—no flux required
Metal arc	"131" nickel welding electrode dc	For welding pure nickel
Submerged melt	"51" nickel wire	For welding pure nickel
INCONEL		
Oxyacetylene	"42" Inconel gas welding wire	For welding Inconel, using *Inco* "2" gas welding flux
Metal arc	"132" Inconel welding electrode ac-dc	For welding Inconel
Submerged melt	"52" Inconel wire	For welding Inconel
70/30 COPPER-NICKEL		
Oxyacetylene	"47" 70/30 copper-nickel gas welding wire	For welding 70/30 copper-nickel using *Inco* "1" gas welding and brazing flux
Metal arc	"137" 70/30 copper-nickel welding electrode dc	For welding 70/30 copper-nickel
Submerged melt	"57" 70/30 copper-nickel wire	For welding 70/30 copper-nickel
"K" MONEL		
Oxyacetylene	"44" "K" Monel gas welding wire	For welding "K" Monel, using 2 parts *Inco* "2" gas welding flux and 1 part lithium fluoride
Metal arc	"134" "K" Monel welding electrode dc	For welding "K" Monel
"L" NICKEL		
Metal arc	"136" nickel welding electrode dc	For welding "L" nickel
NICKEL-CLAD STEEL		
Metal arc	"131" nickel welding electrode dc	For welding nickel side only
"L" NICKEL-CLAD STEEL		
Metal arc	"136" nickel welding electrode dc	For welding "L" nickel side only
MONEL-CLAD STEEL		
Metal arc	"130X" Monel welding electrode dc	For welding Monel side only
INCONEL-CLAD STEEL		
Metal arc	"133" 80/20 nickel-chromium welding electrode ac-dc	For welding Inconel side only

FLUXES

INCO "1" gas welding and brazing flux—For the welding and brazing of Monel and other nickel-copper alloys; copper and copper-nickel.

INCO "2" gas welding flux—For the welding of all stainless steels, rustless irons, Inconel and other chromium-containing alloys.

Efficiency in Material Handling Scored By Westinghouse Engineer

Pittsburgh

• • • **With material** and labor costs rising steadily, American manufacturers' greatest hope for keeping on a sound competitive basis lies in their ability to reduce overhead through efficient plant layout and material handling, members of the American Management Assn. were told recently at a meeting in the Palmer House, Chicago.

"In a normal prewar year, our industries paid out more than $5,000,000,000 just for handling material from the receiving to the shipping stage," declared R. W. Mallick, head of the plant layout and materials handling section of the Westinghouse Electric Corp. "With proper planning by competent engineers handling costs can be greatly reduced."

"Despite our mass production methods of processing and assembling, we have not even scratched the surface of the potentialities offered by sound industrial planning."

Mr. Mallick pointed out that many manufacturers fail to recognize that material handling requires more human effort than processing or assembling and therefore accounts for a greater percentage of the true production costs.

"Studies reveal that within factories, a unit of material averages from 20 to 150 handlings, dependent on the product and the industry," he continued. "Taking the minimum figure, for every 1000 lb of material received at a plant, you pay for handling 20,000 lb through your plant. More efficient handling methods will reduce costs, reduce accidents and allow more production with better quality."

While proper planning for most efficient material handling can be worked out for existing factories, it is doubly important that this type of planning be "built into" new plants in this postwar era, Mr. Mallick said.

MACHINE TOOLS

. . . News and Market Activities

Clayton Formula Extended for Tools

Washington

• • • Having the effect of providing a fixed price policy for all government-owned standard general purpose machine tools and machinery, the Surplus Property Administration has issued Regulation 13 which extends the Clayton formula. The Clayton formula provided a depreciation pricing rate for machine tools up to 36 months. The new extension provides a price reduction rate up to 25 yr of active use.

The period of active use of machines will be determined by the selling agency on the basis of the best information reasonably available. The percentages of original cost to be applied as selling prices range all the way from 85 to 90 pct for machines used less than one month to 15 to 20 pct for those which have been in active use 25-yr. Machines used more than 25 yr will be sold at current market prices, but not in excess of the 25-yr price determined in the formula.

The selling agency will determine the original price, f.o.b. the plant of the manufacturer of the machine, including electrical equipment, standard or special attachments sold with the machine. In the case of machine tools and metal forming and shoping machines manufactured prior to March 1, 1941, the price on that date of the nearest equivalent machine may be taken as the original price. In the case of standard and general purpose machines, other than machine tools and metal forming and shoping machines, manufactured prior to Oct. 1, 1941, the price on that date of the nearest equivalent machine may be taken as the original price.

The period of active use will be considered to run from the estimated date the machine was originally put into use to the date of sale, if the machine is then still in use. If the machine is not in use at the time of sale, the period will run to the estimated date when the machine last became idle.

In announcing the extension of the pricing formula, W. Stuart Symington, Surplus Property Administrator, stated that now that fixed prices have been established for a wider range of equipment "we are working out a program for the distribution of machine tools and equipment through the normal channels of trade in the industry. This program will assist in the modernization of American industry by the replacement of obsolete and worn-out machine tools with more modern equipment from the government surplus."

A machine tool inventory recently furnished to the SPA by the owning agencies showed there was a potential surplus of approximately 700,000 items, of which approximately 340,000 items consist of "cut-a-chip" machine tools. From this potential surplus, however, must be deducted tools and other items of plant equipment which will be needed for a strategic reserve to be used in event of future emergency. The War and Navy Depts. and the Maritime Commission are currently developing requirements for such reserve.

Also a survey is currently being made to determine the approximate number of plant equipment items that will be required to satisfy government agencies and educational institutions.

An inter-agency committee also is currently at work determining which items of metal-working machinery will have no civilian production application, with a view toward salvaging the usable parts from such special equipment.

The same committee, in cooperation with industry also is working out comparable formulae for those items of special equipment and machinery not now covered by SPA Regulation No. 13.

Organizes Machine Firm

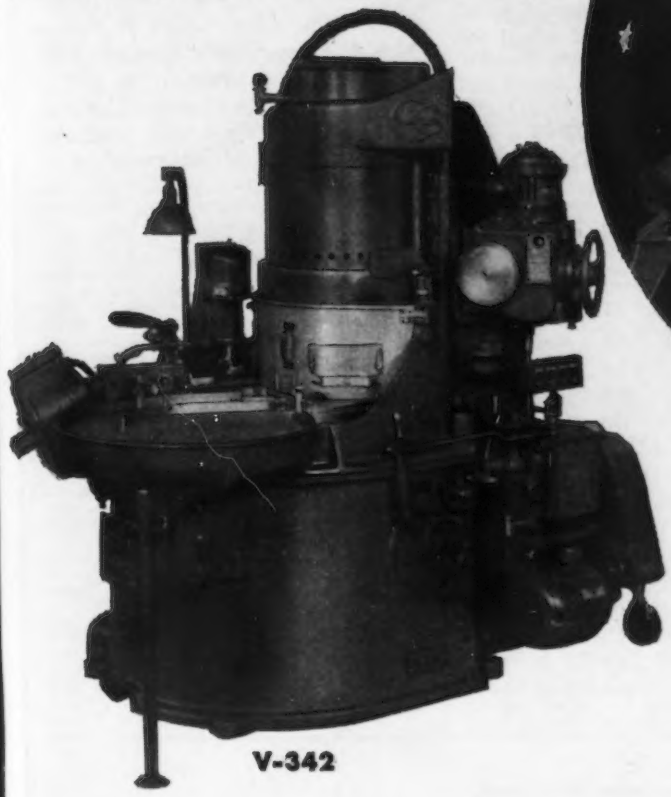
Columbus, Ohio

• • • Cincinnati Machine & Tool Co. has been incorporated with an authorized capital of $100,000. The company is a subsidiary of the Cincinnati Milling Machine Co., but will be independently operated. The new company has acquired the land, buildings, machinery, designs, inventory, unfilled orders and trade name of the Cincinnati Lathe & Tool Co., Oakley. The manufacture of "Cinti Lathes" in sizes from 14 to 32 in. will be continued by the company. Officers are Millard Romaine, president and E. W. Mueller, secretary-treasurer.

• • • *The following percentages of original cost are to be applied under the new formula, Column B relating to the buyer who is using the machine at the time of sale, or if the machine is then idle, the person who last used it, and Column A is applied where the sale is to any other buyer:*

Period of Active Use	A Pct	B Pct
Less than 1 month	85.0	90.0
1 month	82.5	87.5
2 months	80.0	85.0
3 months	77.5	82.5
4 months	75.0	80.0
5 months	72.5	77.5
6 months	70.0	75.0
7 months	69.0	74.0
8 months	68.0	73.0
9 months	67.0	72.0
10 months	66.0	71.0
11 months	65.2	70.2
12 months	64.4	69.4
13 months	63.6	68.6
14 months	62.8	67.8
15 months	62.0	67.0
16 months	61.2	66.2
17 months	60.4	65.4
18 months	59.6	64.6
19 months	58.8	63.8
20 months	58.0	63.0
21 months	57.2	62.2
22 months	56.4	61.4
23 months	55.6	60.6
24 months	54.8	59.8
25 months	54.0	59.0
26 months	53.2	58.2
27 months	52.4	57.4
28 months	51.6	56.6
29 months	50.8	55.8
30 months	50.0	55.0
31 months	49.2	54.2
32 months	48.4	53.4
33 months	47.6	52.6
34 months	46.8	51.8
35 months	46.0	51.0
36 months	45.2	50.2
37 months	44.6	49.6
38 months	44.9	49.0
39 months	43.4	48.4
40 months	42.8	47.8
41 months	42.2	47.2
42 months	41.6	46.6
43 months	41.1	46.1
44 months	40.6	45.6
45 months	40.1	45.1
46 months	39.6	44.6
47 months	39.1	44.1
48 months	38.6	43.6
49 months	38.2	43.2
50 months	37.8	42.8
51 months	37.4	42.4
52 months	37.0	42.0
53 months	36.6	41.6
54 months	36.2	41.2
55 months	36.0	41.0
56 months	35.8	40.8
57 months	35.6	40.6
58 months	35.4	40.4
59 months	35.2	40.2
5 years	35.0	40.0
6 years	34.0	39.0
7 years	33.0	38.0
8 years	32.0	37.0
9 years	31.0	36.0
10 years	30.0	35.0
11 years	29.0	34.0
12 years	28.0	33.0
13 years	27.0	32.0
14 years	26.0	31.0
15 years	25.0	30.0
16 years	24.0	29.0
17 years	23.0	28.0
18 years	22.0	27.0
19 years	21.0	26.0
20 years	20.0	25.0
21 years	19.0	24.0
22 years	18.0	23.0
23 years	17.0	22.0
24 years	16.0	21.0
25 years	15.0	20.0

"Put it on the Blanchard"



V-342

These 3" x 1⅝" x ⅜" Cold Rolled Steel Punchings are ground on a No. 16-A Blanchard Automatic Grinder to very close limits and with high production.

In a roughing operation and with one pass under the wheel, .014" of stock is removed. A finish operation grinds to limits of ±.0005". Production is 235 pieces per hour completely finished, which involves the grinding of two sides twice or 940 surfaces per hour.

The No. 16-A Blanchard Automatic Grinder is ideal for quantity production of small parts. It grinds continuously with a wheel that is set and automatically maintained at a fixed height. The operator has only to load the work on the magnetic chuck or fixture. Unloading is automatic, and if desired, attachments can be supplied for demagnetizing and washing the work as it leaves the grinder.

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NON-FERROUS METALS

. . . News and Market Activities

Nickel Adds to D&R Field Representatives

New York

• • • **In line with its** postwar program to expand the field service of its Development and Research Div., the International Nickel Co. is about to establish a representative in Cincinnati, and later in Cleveland and Minneapolis naming, respectively, R. B. Kropf, J. W. Spretnak, formerly of the Mellon Institute of Industrial Research, and J. C. Neemes, formerly of Steel Sales Corp.

As many as ten additional representatives are contemplated in several other cities including Buffalo, Cleveland and St. Louis but plans have not matured sufficiently to disclose additional details.

Fix Aluminum Sheet Price

New York

• • • **Because there have** been reported sales of surplus aluminum sheet at low prices, the RFC in order to maintain an orderly market has sent out instructions to the various disposing agencies covering discounts from mill prices. This would result in surplus sheet prices of about 16c to 18c per lb.

Surplus Metals Plants

New York

• • • **Of 18 additional** government-owned industrial plants offered by RFC for sale or lease, three are nonferrous metals producers.

One is the Amco Magnesium Co. plant at Wingdale, N. Y., designed to quarry dolomite, extract magnesium, and melt and alloy magnesium with other light metals. The plant has a rated capacity of 10 million lb magnesium per yr.

The Wah Chang Trading Co. plant at Glen Cove, N. Y., was designed to treat and purify tungsten ore. Its rated capacity is 10,000 to 15,000 tons per yr.

The Tantalum Defense Corp. of North Chicago, Ill., was a wartime producer of tantalum metal and oxide.

OPA Names Brass Mill Advisory Committee

New York

• • • **A brass mill products** industry advisory committee has been established by OPA to counsel on prices for peacetime brass mill products.

The members of the committee are:

John A. Coe, Jr., executive vice-president, American Brass Co., Waterbury, Conn.

J. A. Doucette, vice-president, Revere Copper and Brass Co., New York City.

R. L. Coe, vice-president, Chase Brass and Copper Co., Waterbury, Conn.

A. R. Zender, vice-president in charge of sales, Bridgeport Brass Co., Bridgeport, Conn.

J. Roy Murdock, vice-president, Volco Brass and Copper Co., Kenilworth, N. J.

H. L. Randall, president, Riverside Metal Co., Riverside, N. J.

F. L. Riggin, Sr., president, Mueller Brass Co., Port Huron, Mich.

Roger Gay, president, Bristol Brass Corp., Bristol, Conn.

L. E. Strosburg, sales manager, Linderme Tube Co., Cleveland, Ohio.

Wendell L. Cross, treasurer, Thinsheet Metal Corp., Waterbury, Conn.

George D. Stearns, president, Bridgeport Rolling Mill Co., Bridgeport, Conn.

J. P. Lalley, president, C. G. Hussey Co., Pittsburgh, Pa.

W. W. Seig, vice-president, Titan Metal Mfg. Co., Bellefonte, Pa.

Arthur C. Wheeler, executive vice-president, Seymour Mfg. Co., Seymour, Conn.

Aluminum Primary Ingot Facilities

million pounds per year

Plant	Installed Capacity June 1940	Additions to Capacity: Private[1] July 1940 to Dec. 1941	Additions to Capacity: Private[1] 1942	Additions to Capacity: Government 1st Exp. Program Authorized 6-27-41	Additions to Capacity: Government 2nd Exp. Program Authorized 2-26-42	Total Installed Capacity	Peak Production October 1943	Production in July 1945
TOTAL	400	373	234	617	720	2,344	2,257	1,149
Private Plants, Total	400	373	234			1,007	1,006	745
Aluminum Co. of Am., Total	400	299	144			843	843	587
Alcoa, Tenn.	175	65	108			348	347	252
Badin, N. C.	53	40	17			110	114	56
Massena, N. Y.	134	14	16			164	171	139
Niagara, N. Y.	38	0	3			41	42	38
Vancouver, Wash.	0	180	0			180	169	102
Reynolds Metals Co., Total	0	74[2]	90[2]			164	163	158
Listerhill, Ala.	0	40	61			101	100	100
Longview, Wash.	0	34	29			63	63	58
Government (DPC) Plants, Total	0			617	720	1,337	1,251	404
Alcoa-Operated, Total	0			576[3]	720[3]	1,296	1,212	372
Burlington, N. J.	0			0	108	108	114	0
Jones Mills, Ark.	0			144	0	144	156	109
Los Angeles, Calif.	0			144	36	180	108	0
Queens, N. Y.	0			0	288	288	303	0
Riverbank, Calif.	0			0	108	108	67	0
St. Lawrence, N. Y.	0			108	0	108	109	0
Spokane, Wash.	0			72	144	216	216	160
Troutdale, Ore.	0			108	36	144	139	103
Olin-Operated Tacoma, Wash.	0			41	0	41	39	32

[1] Based on actual production attained.
[2] Government-financed through RFC loans.
[3] Based on capacity of 36 million lb yearly per potline, rather than original estimate of 32 million lb yearly.

Source: WPB

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, del'd (Min. 10,000 lb)	15.00
Aluminum pig	14.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars, per lb. contained Be	$17.00
Cadmium, del'd	90.00
Cobalt, 97-99% (per lb)	$1.50 to $1.57
Copper, electro, Conn. valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$ 2.25
Iridium, dollars per troy oz.	$90-$100
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9 + %, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$106 to $109
Nickel, electro	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per oz.	$35.00
Silver, New York, cents per oz.	71.11
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.65

Remelted Metals

(Cents per lb unless otherwise noted)

Aluminum, No. 12 Fdy. (No. 2)	9.00 to 10.00
Aluminum, deoxidizing No. 2, 3, 4	$6.00 to 9.50
Brass Ingot 85-5-5-5 (No. 115)	13.25
88-10-2 (No. 215)	16.75
80-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.25

Copper, Copper Base Alloys

(Mill base, cents per lb)

	Extruded Shapes	Rods	Sheets
Copper	20.87	....	20.37
Copper, H.R.	....	17.37	....
Copper drawn	....	18.37	....
Low brass, 80%	....	20.40	20.15
High brass	....	....	19.48
Red brass, 85%	....	20.61	20.36
Naval brass	20.37	19.12	24.50
Brass, free cut	....	15.01	....
Commercial bronze, 90%	....	21.32	21.07
Commercial bronze, 95%	....	21.53	21.28
Manganese bronze	24.00	....	28.00
Phos. bronze, A, B, 5%	....	36.50	36.25
Muntz metal	20.12	18.87	22.75
Everdur, Herculoy, Olympic or equal	....	25.50	26.00
Nickel silver, 5%	....	28.75	26.50
Architect bronze	19.12	....	....

Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (½H); 52S, 61c. (O); 24S, 67½c.

Plate: 0.250 in. and heavier: 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness: 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals; ¼ in., 34½c. per lb.; ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths, ¼ in., 24c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in., 23c. 24ST, rectangles and squares, random or standard lengths, 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

NONFERROUS SCRAP METAL QUOTATIONS

†(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2†

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.00
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.00
Automobile radiators	7.25
Zincy bronze borings	7.00
Zincy bronze solids	8.00

OPA Group 3†

Fired rifle shells	8.00
Brass pipe	7.25
Old rolled brass	6.75
Admiralty condenser tubes	7.25
Muntz metal condenser tubes	6.75
Plated brass sheet, pipe reflectors	6.25
Manganese bronze solids	7.00[1]
Manganese bronze solids	6.00[2]
Manganese bronze borings	6.25[1]

OPA Group 4†

Refinery brass	4.50*

*Price varies with analysis, [1] Lead content 0.00 to 0.40 per cent. [2] Lead content 0.41 to 1.00 per cent.

Other Copper Alloys

Briquetted Cartridge Brass Turnings	8.625
Cartridge Brass Turnings, Loose	7.875
Loose Yellow Brass Trimmings	7.875

Aluminum*

Plant scrap, segregated

2S solids	8.00
Dural alloys, solids 14, 17, 18, 24S	4.00
25S turnings, dry basis	3.00
Low copper alloys 51, 52, 61, 63S solids	7.25
turnings, dry basis	5.75

Plant scrap, mixed

Solids	4.00
Turnings, dry basis	2.75

Obsolete scrap

Pure cable	8.00
Old sheet and utensils	6.00
Old castings and forgings	5.00
Pistons, free of struts	5.00
Pistons, with struts	3.00
Old alloy sheet	5.00

Magnesium*

Segregated plant scrap

Pure solids and all other solids, exempt Borings and turnings	1.50

Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

*Nominal.

Zinc

New zinc clippings, trimmings	6.50
Engravers, lithographers plates	6.50
Old zinc scrap	4.75
Unsweated zinc dross	5.00
Die cast slab	4.50
New die cast scrap	4.45
Radiator grilles, old and new	3.50
Old die cast scrap	3.00

Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead including cable, for f.o.b. point of shipment price.

Nickel

Ni content 98+%, Cu under ½%, 26c. per lb.; 90 to 98% Ni, 26c. per lb. contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point in 500 lb. lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	25½
Electrodeposited	18⅞
Rolled, oval, straight	19½
Curved	20⅝
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer	23½
Zinc, cast, 99.99, 15 in. or longer	16¼
Nickel, 99 per cent plus, frt. allowed	
Cast	47
Rolled, depolarized	48
Silver, 999 fine	
Rolled, 100 oz. lots, per oz.	80

Chemicals

(Cents per lb., f.o.b. shipping point)

Copper cyanide, 1-5 bbls.	34.00
Copper sulphate, 99.5, crystals, bbls.	7.75
Nickel salts, single, 425 lb. bbls., frt. allowed	13.50
Silver Cyanide, 100 oz. lots, per oz.	0.6083
Sodium cyanide, 96 per cent, domestic, 100 lb. drums	15.00
Zinc cyanide, 100 lb. drums	33.00
Zinc sulphate, 89 per cent, crystals, bbls., frt. allowed	6.35

SCRAP

Market Firm; Foundry Scrap Critical

New York

• • • **In general, the** market continues tight throughout the country, with prices holding firm at the ceiling. Los Angeles reports an exception, in that a surplus of scrap caused by disposal by harbor shipyards and warplants of termination scrap, has weakened the market in that area. It is believed that this condition will also temporarily affect the San Francisco market.

The increased shortage of pig iron has further tightened the foundry scrap situation. Boston reports heavy foundry cast requirements with purchases limited to occasional truckloads.

The only price change during the past week has occurred in Chicago, where mixed borings and turnings dropped from ceiling to $13.00 per ton. In contrast to this, heavy scrap is moving into Pittsburgh with mills paying the full $1.00 springboard.

For the first time in several years the tightness of scrap and the fact that all scrap prices are at ceiling has caused an attempt on the part of some scrap people to raise the price ceiling on No. 1 steel, 10 pct. The reason, it is said, is the dearth of this grade especially since under the ceiling setup, No. 2 scrap must bring the same price. Some rumbling is heard that the cost of preparing scrap is so high that it is useless to separate the grades at present return.

•

PITTSBURGH—If the market here is dull, but not for the lack of orders. Dealers indicate that they could all sell far more scrap than they have. Prices are holding firm, but production scrap is not coming from manufacturing plants. Until reconversion is completed, dealers do not expect any heavy turnover in scrap. Mills here are paying the full $1.00 springboard for heavy scrap, and Youngstown mills are taking low phos for use in the openhearth at the low phos premium price. Short shoveling turnings can be sold, but many buyers are insisting they be shipped from yards, wishing to avoid as much of the springboard and freight absorption as possible. Government surpluses have been coming out, but not in quantities great enough to have any effect on prices.

•

CHICAGO — Return to normal blast charge ratios with the end of strike-induced coal shortages has caused a drop in buying of blast furnace grades and a sale of several hundred tons of mixed borings and turnings at $13.00. Some buyers are still buying on outstanding orders at ceiling, and for out-of-district orders, however. Openhearth and electric furnace grades continue strong, and with the district operating rate mounting, demand should continue heavy at these high levels. Shortage of merchant pig iron has caused additional demand for cast scrap, but lack of availability prevents the market from developing any volume.

•

PHILADELPHIA—There have been reports that scrap sources have been flirting with the idea that ceiling prices on No. 1 scrap should be raised 10 pct. The reason for this request is said to be the shortage of that grade inasmuch as No. 2 steel is priced the same under the ceiling limits. Brokers and dealers claim that the return on preparing unprepared scrap is too low to cause anyone to be interested. Meanwhile demand is heavy for all grades, supplies are short and the market stays at ceiling prices with demand unfulfilled.

•

DETROIT — The scrap situation continues unchanged. Demand still exceeds supply of scrap of all grades, and the flow of material to meet requirements is believed by some interests to be slackening. All agree that a fairly regular amount of scrap from war plants now being reconverted is all that is saving the present situation. Fears are being expressed that if major strikes occur in the auto industry, the supply will be so depleted that the mills will be seriously embarrassed.

•

BOSTON—Unprepared steel has been taken by the Lunt Iron & Steel Co., Youngstown, at $12.33 a ton. That price is above ceiling, but because material was ordered to yard instead of consumer, OPA approved it. Pittsburgh mills will take steel tonnages, but shipments are curtailed by lack of yard labor to prepare material and material itself is scarce. Foundry cast requirements for the next three or four months runs into five figures. Current purchases are limited to occasional truckloads. Prospects for increased supplies are not bright.

•

NEW YORK — The market is strong with prices remaining at ceiling. The labor shortage situation in the scrapyards is beginning to improve, resulting in an increase of scrap volume. The good scrap demand holds the market tight. Termination scrap volume is also on the upgrade.

•

BUFFALO — Mill scrap prices were clamped tighter to the ceiling this week by one of the leading consumers who notified dealers that Canal springboard would be paid for deliveries on all outstanding contracts. Otherwise the market followed the pattern of recent weeks with the volume of blast furnace and openhearth grades lagging while dealers are well supplied with orders. Another 2500 tons arrived from the Seaboard by barge and an additional 5000 tons is reported in the Canal System.

•

CLEVELAND—With the exception of shipments which have shown a slight upturn, market conditions are unchanged here with all grades continuing to bring ceiling prices and in tight supply. Termination inventory sales are increasing, but this material is coming out on the market at very high prices, in many cases. One of the many lots offered was at Republic Steel's Truscon plant, consisting of about 2000 tons of assorted grades of unprepared material.

•

CINCINNATI—The iron and steel scrap market in this area continues to be tight, with demands well sustained. Heavy buying is almost absent, but melters, generally, are specifying regularly in an apparent attempt to maintain present inventories. The tightness in the pig iron market has also brought about a heavier purchasing of foundry grades of scrap. Prices remain unchanged with current contracts and business being placed at the ceiling.

•

BIRMINGHAM—Little change in trend is being experienced here with demand strong for all grades except electric furnace and foundry material. Tonnages of shipyard scrap continue to move into this district for openhearth consumption.

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LOS ANGELES—Disposal by harbor shipyards and local war plants of terminal quantities of scrap left over from war contracts has further weakened the local market and dropped current quotations as much as $3.00 to $4.00 per gross ton below the San Francisco market, only 450 railway miles away. Principal mill buyers have not been active in recent weeks. One dealer is said to be purchasing up to 150,000 tons at prices ranging from $6.75 to $9.00 per gross ton unprepared. There seems every probability that the San Francisco market will weaken and delivered prices drop from 50c. to $1.00 per gross ton during the temporary glut of material.

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PORTLAND, ORE.—Efforts by Chicago district interests to secure a reduction in rail freight rate from $14.78 to $10.00 per gross ton on scrap shipments from here to Chicago and Gary have so far been unsuccessful, but local industrial and chamber of commerce executives are apprehensive that the Pacific Northwest's 350,000 ton annual scrap pile may be threatened. It is estimated that the Portland-Vancouver area now has 90,000 tons of surplus scrap resulting from cancellation of ship contracts and scrapping of partially constructed hulls.

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Where asterisks are used on quotations below, this indicates a ceiling price to which must be added brokerage fee and adjusted freight.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
RR. hvy. melting	21.00*
No. 2 hvy. melting	20.00*
RR. scrap rails	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bdld. new shts.	20.00*
Hvy. axle turn.	19.50*
Hvy. steel forge turn.	19.50*
Mach. shop turn.	$14.50 to 15.00
Short shov. turn.	17.00*
Mixed bor. and turn.	15.00*
Cast iron borings	16.00*
Hvy. break cast.	16.50*
No. 1 cupola	20.00*
RR. knuck. and coup.	24.50*
RR. coil springs	24.50*
Rail leaf springs	24.50*
Rolled steel wheels	24.50*
Low phos. bil. crops	25.00*
Low phos.	22.50*
RR. malleable	22.00*

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 1 bundles	18.75*
No. 2 dealers' bndls.	18.75*
Bundled mach. shop turn.	18.75*
Galv. bundles	16.75*
Mach. shop turn.	13.75*
Short shovels, turn.	15.75*
Cast iron borings	14.75*
Mix. borings & turn.	$13.00 to 13.75*
Low phos. hvy. forge	23.75*
Low phos. plates	21.25*
No. 1 RR. hvy. melt.	19.75*
Reroll rails	22.25*
Miscellaneous rails	20.25*
Rails 3 ft. and under	22.25*
Locomotive tires, cut	$22.75 to 23.25
Cut bolsters & side frames	20.25 to 20.75
Angles & splice bars	22.25*
Standard stl. car axles	24.00 to 24.50
No. 3 steel wheels	23.25*
Couplers & knuckles	23.25*
Agricul. malleable	22.00*
RR. malleable	22.00*
No. 1 mach. cast	20.00*
No. 1 agricul. cast	20.00*
Hvy. breakable cast.	16.50*
RR. grate bars	15.25*
Cast iron brake shoes	15.25*
Stove plate	19.00*
Clean auto cast.	20.00*
Cast iron carwheels	20.00*

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
No. 1 bundles	19.50*
No. 2 bundles	19.50*
Mach. shop turn.	$10.50 to 11.00
Shoveling turn.	12.50 to 13.00
Cast iron borings	11.50 to 12.00
Mixed bor. & turn.	11.50 to 12.00
Low phos. plate	22.00*
No. 1 cupola cast.	20.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Scrap rails	21.00*

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	$15.05*
No. 2 hvy. melting	15.05*
No. 1 and 2 bundles	15.05*
Busheling	15.05*
Turnings, shovelings	12.05*
Machine shop turn.	10.05*
Mixed bor. & turn.	10.05*
Cl'n cast, chem. bor.	$13.06 to 14.15*

Truck delivery to foundry

Machinery cast.	21.00 to 23.51*
Breakable cast	21.57 to 21.87*
Stove plate	20.00 to 23.51*

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	$17.32*
No. 2 hvy. melting	17.32*
No. 1 bundles	17.32*
New busheling	17.32*
Flashings	17.32*
Mach. shop turn.	12.32*
Short shov. turn.	14.32*
Cast iron borings	13.32*
Mixed bor. & turn.	12.32*
Low phos. plate	19.32*
No. 1 cupola cast.	20.00*
Charging box cast.	19.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Automotive cast	20.00*

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 2 bundles	18.75*
Mach. shop turn.	13.75*
Shoveling turn.	15.75*
Cast iron borings	$13.50 to 14.00
Mixed bor. & turn.	13.75*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Cast, charging box	19.00*
Hvy. axle forge turn.	18.25*
Low phos. plate	21.25*
Low phos. punchings	21.25*
Billet crops	21.25*
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. malleable	22.00*

ST. LOUIS

Per gross ton delivered to consumer:

Heavy melting	$17.50*
Bundled sheets	17.50*
Mach. shop turn.	10.00
Locomotive tires, uncut	18.00
Misc. std. sec. rails	19.00*
Rerolling rails	21.00*
Steel angle bars	21.00*
Rails 3 ft. and under	21.50*
RR. springs	21.00 to 21.50
Steel car axles	21.00 to 21.50
Stove plate	19.00*
Grate bars	15.25*
Brake shoes	15.25*
RR. malleable	22.00*
Cast iron carwheels	20.00*
No. 1 mach'ery cast	20.00*
Breakable cast	16.50*

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$17.00*
No. 2 hvy. melting	17.00*
No. 2 bundles	17.00*
No. 1 busheling	17.00*
Long turnings	$10.50 to 11.00
Shoveling turnings	14.00*
Cast iron borings	13.00*
Bar crops and plate	18.00 to 18.50
Structural and plate	18.00 to 18.50
No. 1 cast	20.00*
Stove plate	19.00*
Steel axles	18.50*
Scrap rails	18.50
Rerolling rails	20.50*
Angles & splice bars	20.50 to 21.00
Rails 3 ft. & under	21.00*
Cast iron carwheels	16.50 to 17.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
No. 2 hvy. melting	20.00*
Low phos. plate	22.50*
No. 1 busheling	20.00*
Hydraulic bundles	20.00*
Mach. shop. turn.	15.00*
Short shovel. turn.	17.00*
Cast iron borings	16.00*

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$15.32*
No. 2 hvy. melting	15.32*
Comp. black bundles	15.32*
Comp. galv. bundles	13.32
Mach. shop turn.	10.32
Mixed bor. & turn.	10.32
Shoveling turn.	12.32*
No. 1 cupola cast.	20.00*
Hvy. breakable cast	16.50*
Charging box cast	19.00*
Stove plate	19.00*
Clean auto cast.	20.00*
Unstrip. motor blks.	17.50*
Cl'n chem. cast bor.	14.32*

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.25*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
No. 2 hvy. melting	19.25*
Mach. shop turn.	14.25*
Shoveling turn.	16.25*
Cast iron borings	14.25*
Cast iron borings	15.25
Mixed bor. & turn.	14.25*
Stove plate	19.00*
Low phos. plate	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels	23.75*
Cast iron car wheels	20.00*
RR. coil & leaf spgs.	23.75*
RR. knuckles & coup.	23.75*
RR. malleable	22.00*
No. 1 busheling	19.25*

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00
No. 2 bundles	19.50*
Mach. shop turn.	14.50*
Short shovel.	16.50*
No. 1 busheling	19.50*
Steel axle turn.	19.00*
Low phos. billet and bloom crops	24.50*
Cast iron borings	15.50*
Mixed bor. & turn.	14.50*
No. 2 busheling	17.00*
No. 1 machine cast	20.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	19.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Railroad malleable	22.00*
Elec. furnace punch	22.00*

SAN FRANCISCO

Per gross ton delivered to consumer:

RR. hvy. melting	$15.50 to $16.25
No. 1 hvy. melting	15.50 to 16.25
No. 2 hvy. melting	14.50 to 15.25
No. 2 bales	13.00 to 13.75
No. 3 bales	9.50 to 10.25
Mach. shop turn.	7.00
Elec. furn. 1 ft. und.	15.50 to 17.00
No. 1 cupola cast.	19.00 to 21.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$12.00 to $13.00
No. 2 hvy. melting	11.00 to 12.00
No. 2 bales	10.00 to 11.00
No. 3 bales	9.00 to 10.00
Mach. shop turn.	4.50
No. 1 cupola cast.	19.00 to 21.00

SEATTLE

Per gross ton delivered to consumer:

RR. hvy. melting	$10.00
No. 1 & No. 2 hvy. melting	10.00
Elec. furn. 1 ft. und.	$14.00 to 15.00
No. 1 cupola cast.	20.00*

TORONTO

Per gross ton delivered to consumer

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points, in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Mill run sheet, 10¢ per 100 lb under base; primes, 25¢ above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb. to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. (14) Billets only. (15) 9/32 in. to 47/64 in., 0.15c. per lb higher.

Basing Points	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
INGOTS															
Carbon, rerolling	($31.00 f.o.b. mill)														
Carbon, forging	$36	$36	$36	$36	$36	$36	$36								
Alloy	$45	$45				$45	(Bethlehem, Massillon, Canton, Coatesville=$45)								
BILLETS, BLOOMS, SLABS							(Provo=$47.20, Duluth=$38[14])								
Carbon, rerolling	$36	$36	$36	$36	$36	$36	$36	$36				$48[14]	$38		
							(Provo=$53.20, Duluth=$44[14])								
Carbon, forging	$42	$42	$42	$42	$42	$42	$42					$54[14]	$44		
Alloy	$54	$54				$54		(Bethlehem, Massillon, Canton=$54)					$56		
SHEET BARS	$36	$36		$36		$36	$36	$36	(Canton=$36)						
PIPE SKELP	1.90¢	1.90¢					1.90¢	1.90¢	(Coatesville=1.90¢)						
WIRE RODS[15]															
No. 5 to 9/32 in.	2.15¢	2.15¢		2.15¢	2.15¢	(Worcester=2.25¢)					2.40¢	2.65¢			
SHEETS															
Hot-rolled	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.30¢	2.20¢		2.75¢	2.30¢	2.44¢	2.37¢
Cold-rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 gage)	3.70¢	3.70¢	3.70¢		3.70¢	3.70¢	3.70¢	3.70¢	3.80¢	3.70¢		4.25¢		3.94¢	3.87¢
Enameling (20 gage)	3.45¢	3.45¢	3.45¢	3.45¢			3.45¢		3.55¢	3.45¢		4.10¢	3.55¢	3.81¢	3.77¢
Long ternes[2]	3.80¢	3.80¢	3.80¢									4.55¢		4.16¢	4.12¢
STRIP															
Hot-rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold-rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester=3.00¢)					2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity cold-rolled	2.95¢	3.05¢		2.95¢			2.95¢	(Worcester=3.35¢)					3.05¢	3.31¢	
TINPLATE															
Standard cokes, base box	$5.00	$5.00	$5.00						$5.10					$5.36	$5.32
Electro, box 0.25 lb	$4.35	$4.35	$4.35						$4.60						
Electro, box 0.50 lb	$4.50	$4.50	$4.50						$4.75						
Electro, box 0.75 lb	$4.65		$4.65												
BLACKPLATE															
29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢[11]			3.37¢
TERNES, MFG.															
Special coated, base box	$4.30	$4.30	$4.30						$4.40						
BARS								(Duluth=2.35¢,							
Carbon steel	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢	2.25	Provo, Utah 2.95¢)			2.60¢	2.90¢	2.35¢	2.59¢	2.57¢
Rail steel[6]	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢					2.60¢	2.90¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢	2.39¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		2.47¢
Cold-finished[8]	2.75¢	2.75¢	2.75¢	2.75¢		2.75¢			(Detroit=2.80¢)		(Toledo=2.90¢)			3.09¢	3.07¢
Alloy, hot-rolled	2.70¢	2.70¢				2.70¢	2.70	(Bethlehem, Massillon, Canton=2.70¢)					2.80¢		
Alloy, cold-drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
PLATES								(Coatesville and Claymont=2.25¢, Provo, Utah 2.95¢)							
Carbon steel[13]	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢		2.25¢	2.25¢			2.60¢	2.80¢	2.47¢	2.44¢	2.30¢
Floor plates	3.50¢	3.50¢									3.85¢	4.15¢		3.86¢	3.82¢
Alloy	3.50¢	3.50¢			(Coatesville=3.50¢)						3.95¢	4.15¢		3.70¢	3.59¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Bethlehem=2.10¢)				2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R															
0.26 to 0.50 carbon	2.80¢			2.80¢			(Worcester=3.00¢)								
0.51 to 0.75 carbon	4.30¢			4.30¢			(Worcester=4.50¢)								
0.76 to 1.00 carbon	6.15¢			6.15¢			(Worcester=6.35¢)								
1.01 to 1.25 carbon	8.35¢			8.35¢			(Worcester=8.55¢)								
WIRE[9]															
Bright[12]	2.75¢	2.75¢		2.75¢	2.75¢		(Worcester=2.85¢)			(Duluth=2.80¢)		3.25¢			3.07¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire base														
Spring (high carbon)	3.35¢	3.35¢		3.35¢			(Worcester=3.45¢)					3.85¢			3.67¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢

CORROSION AND HEAT RESISTANT STEELS

in cents per pound, f.o.b. basing point

BASING POINT	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt	21.25	20.40	15.725	16.15	19.125	23.375
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	21.25	20.40	15.725	16.15	19.125	23.375
Billets, P'gh, Chi, Canton, Newark, N. J., Watervliet, Syracuse, Balt	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Watervliet, Syracuse, Newark, N. J., Ft. Wayne, Titusville	21.25	20.40	15.725	16.15	19.125	23.375
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	25.00	24.00	18.50	19.00	22.50	27.50
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	25.00	24.00	18.50	19.00	22.50	27.50
Plates, P'gh, Middletown, Canton	29.00	27.00	21.50	22.00	26.50	30.50
Shapes, structural, P'gh, Chi	25.00	24.00	18.50	19.00	22.50	27.50
Sheets, P'gh, Chi, Middletown, Canton, Balt	36.00	34.00	26.50	29.00	32.50	36.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	23.50	21.50	17.00	17.50	24.00	35.00
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	30.00	28.00	22.00	22.50	32.00	52.00
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila	25.00	24.00	18.50	19.00	22.50	27.50
Wire flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	30.00	28.00	22.00	22.50	32.00	52.00
Rod, h-r, Newark, N. J. Syracuse	25.00	24.00	18.50	19.00	22.50	27.50
Tubing, seamless, P'gh Chi, Canton, (4 in. to 6 in.)	66.63	66.63	.....	63.30	.....	.....

SHELL STEEL

	per gross ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic openhearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.00 higher; East Michigan, $3 higher.

Price Exceptions: Follansbee Steel Corp. permitted to sell at $13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of $52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	per lb.
Field grade	3.30¢
Armature	3.65¢
Electrical	4.15¢
Motor	5.05¢
Dynamo	5.75¢
Transformer 72	6.25¢
Transformer 65	7.25¢
Transformer 58	7.75¢
Transformer 52	8.55¢

F.o.b. Granite City, add 10¢ per 100 lb. on field grade to and including dynamo. Pacific ports add 75¢ per 100 lb. on all grades.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., gross ton	$43.00
Angle splice bars, 100 lb	2.70
(F.o.b. Basing Points)	*per gross ton*
Light rails (from billets)	$45.00
Light rails (from rail steel)	44.00
	base per lb.
Cut spikes	3.25¢
Screw spikes	5.40¢
Tie plate, steel	2.30¢
Tie plates, Pacific Coast	2.45¢
Track bolts	4.75¢
Track bolts, heat treated, to railroads	5.00¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25¢.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk)

(*Also Canton, O.)	base per lb.
High speed	67¢
Straight molybdenum	54¢
Tungsten-molybdenum	57½¢
High-carbon-chromium*	43¢
Oil hardening*	24¢
Special carbon*	22¢
Extra carbon*	18¢
Regular carbon*	14¢

Warehouse prices east of Mississippi are 2¢ per lb. higher; west of Mississippi 3¢ higher.

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Pa.	18.00*	19.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	18.00	....
Inconel-clad		
10 pct, f.o.b. Coatesville	25.00	....
Monel-clad		
10 pct, f.o.b. Coatesville	24.00	....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

*Includes annealing and pickling.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points†
	base per keg	
Standard wire nails	$2.90	$3.40
Coated nails	2.90	3.40
Cut nails, carloads	3.85	....
	base per 100 lb.	
Annealed fence wire	$3.05	$3.55
Annealed galv. fence wire	3.40	3.90
	base column	
Woven wire fence*	67	85
Fence posts, carloads	69	86
Single loop bale ties	66	91
Galvanized barbed wire**	72	82
Twisted barbless wire	72	....

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00

ALLOY EXTRAS

Alloy Steel	Basic Openhearth		Electric Furnace	
	Bars and Bar-strip	Billets, Blooms, and Slabs	Bars and Bar-strip	Billets, Blooms, and Slabs
NE 8600	0.85¢	$13.00	$1.15	$23.00
NE 8700	0.70	14.00	1.20	24.00
NE 9400	0.75	15.00	1.25	25.00
NE 9700	0.65	13.00	1.15	23.00
NE 9800	1.30	26.00	1.80	36.00
NE 9900	1.20	24.00	1.55	31.00

The extras shown are in addition to the base price of $2.70 per 100 lb on finished products and $54 per gross ton on semifinished steel, major basing points, as shown in table, opposite page, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. When acid openhearth is specified and acceptable, add to basic openhearth alloy differential 0.25¢ per lb for bars and bar-strip and $5 per gross ton for billets, blooms and slabs.

WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills

(F.o.b. Pittsburgh only on wrought pipe) base price—$200.00 per net ton

	Black	Galv.
Steel (buttweld)		
½-in.	63½	51
¾-in.	66½	55
1-in. to 3-in.	68½	57½
Wrought Iron (buttweld)		
⅛-in.	24	3½
¼-in.	30	10
⅜-in. and 1¼-in.	34	16
1½-in.	38	18½
2-in.	37½	18
Steel (lapweld)		
2-in.	61	49½
2½-in. and 3-in.	64	52½
3½-in. to 6-in.	66	54½
Wrought Iron (lapweld)		
2-in.	30½	12
2½-in. to 3½-in.	31½	14½
4-in.	33½	18
4½-in. to 8-in.	32½	17
Steel (butt, extra strong, plain ends)		
½-in.	61½	50½
¾-in.	65½	54½
1-in. to 3-in.	67	57
Wrought Iron (same as above)		
½-in.	25	6
¾-in.	31	12
1-in. to 2-in.	38	19½
Steel (lap, extra strong, plain ends)		
2-in.	59	48½
2½-in. and 3-in.	63	52½
3½-in. to 6-in.	66½	56
Wrought Iron (same as above)		
2-in.	33½	15½
2½-in. to 4-in.	39	22½
4½-in. to 6-in.	37½	21

On buttweld and lapweld steel pipe jobbers are granted a discount of 5 pct. On l.c.l. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lapweld and one point lower discount, or $2 a ton higher on all buttweld.

BOILER TUBES

Seamless steel and lapweld commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots.

	Seamless Cold-Drawn	Hot-Rolled	Lapweld, Hot-Rolled
2 in. O.D. 13 B.W.G.	15.03	13.04	12.38
2½ in. O.D. 12 B.W.G.	20.31	17.54	16.58
3 in. O.D. 12 B.W.G.	22.48	19.50	18.35
3½ in. O.D. 11 B.W.G.	28.37	24.62	23.15
4 in. O.D. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb or ft and over	Base
30,000 lb or ft to 39,999 lb or ft	5 pct
20,000 lb or ft to 29,999 lb or ft	10 pct
10,000 lb or ft to 19,999 lb or ft	20 pct
5,000 lb or ft to 9,999 lb or ft	30 pct
2,000 lb or ft or 4,999 lb or ft	45 pct
Under 2,000 lb or ft	65 pct

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger, f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are $45 at Birmingham and $53.80 delivered Chicago, $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle. Delivered prices do not reflect 3 pct tax on freight rates.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

	Percent Off List
½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all lengths	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less keg lots		
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 in. through 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full keg lots, 10 pct additional discount.

Stove Bolts	*Consumer*
Packages, nuts loose	71 and 10
In packages, with nuts attached	71
In bulk	80

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets

(½ in. and larger)

	Base per 100 Lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.75

Small Rivets

(7/16 in. and smaller)

	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws	*Consumer Percent Off List*
Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Exception

When the WPB Steel Div. certifies in writing the consumers need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Effective CaF_2 Content:	Base price per short ton
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, cents per lb, ton lots.

Copper, electrolytic, 150 and 200 mesh	21½¢ to 23½¢
Copper, reduced, 150 and 200 mesh	20½¢ to 25½¢
Iron, commercial, 100 and 200 mesh 96 + % Fe	12½¢ to 15¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	4¢
Iron, hydrogen reduced, 300 mesh and finer, 98½ + % Fe, drum lots	63¢
Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe	30 to 33¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	42¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢
Aluminum, 100 and 200 mesh	*25¢
Antimony, 100 mesh	30¢
Cadmium, 100 mesh	$1.40
Chromium, 100 mesh and finer	$1.25
Lead, 100, 200 & 300 mesh	11½ to 15¢
Manganese	65¢
Nickel, 150 mesh	51½¢
Solder powder, 100 mesh	8½¢ plus metal
Tin, 100 mesh	58¾¢
Tungsten metal powder, 98%-99%, any quantity, per lb	$2.60
Molybdenum powder, 99%, in 200-lb kegs, f.o.b. York, Pa., per lb	$2.60
Under 100 lb	$3.00

*Freight allowed east of Mississippi.

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$7.50*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	9.00
Foundry, Byproduct	
Chicago, del'd	13.75
Chicago, f.o.b.	13.00
New England, del'd	14.65
Kearny, N. J., f.o.b.	13.05
Philadelphia, del'd	13.28
Buffalo, del'd	13.40
Portsmouth, Ohio, f.o.b.	11.50
Painesville, Ohio, f.o.b.	12.15
Erie, del'd	13.15
Cleveland, del'd	13.20
Cincinnati, del'd	13.25
St. Louis, del'd	14.25
Birmingham, del'd	10.90

*Hand drawn ovens using trucked coal permitted to charge $8.60 per ton plus transportation charges.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	*Per 1000*
Super-duty brick, St. Louis	$68.50
First quality, Pa., Md., Ky., Mo., Ill.	54.40
First quality, New Jersey	59.35
Sec. quality, Pa., Md., Ky., Mo., Ill.	49.35
Sec. quality, New Jersey	51.95
No. 1 Ohio	45.60
Ground fire clay, net ton	8.05
Silica Brick	
Pennsylvania and Birmingham	$54.40
Chicago District	62.45
Silica cement, net ton (Eastern)	9.55

Chrome Brick	*Per Net Ton*
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$54.00
Magnesite Brick	
Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00
Grain Magnesite	
Domestic, f.o.b. Balt. and Chester in sacks (carloads)	$43.48
Domestic, f.o.b. Chewelah, Wash.	
in bulk	22.00
in sacks	26.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)*

	Per Gross Ton
Old range, bessemer, 51.50	$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorus, 51.50	4.35

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 8617-20	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 8617-20	Cold Drawn, NE 9442-45 Ann.
**Philadelphia	$3.518	$4.872[5]	$4.768[a]	$3.922	$4.772	$3.606	$3.666	$3.822	$4.172	$5.816	$6.866	$7.072	$8.172
New York	3.59	4.613[3]	5.110	3.974[6]	4.772	3.768	3.758	3.853	4.203	5.858	6.908	7.103	8.203
Boston	3.744	4.744[9]	5.224[9]	4.106	4.715	3.912	3.912	4.044	4.244	6.012	7.062	7.194	8.394
Baltimore	3.394	4.852	4.894	3.902	4.752	3.594	3.759	3.802	4.152	....	....	....	....
Norfolk	3.771	4.965	5.371	4.165	4.865	3.971	4.002	4.065	4.265	....	....	....	....
Chicago	3.25	4.20	5.231	3.60	4.65[17]	3.55	3.55	3.50	3.85	5.60	6.65	6.65	7.90
Milwaukee	3.387	4.337[3]	5.272[4]	3.737	4.787[17]	3.687	3.687	3.637	3.987	5.837	6.887	6.887	7.987
Cleveland	3.35	4.40	4.877[4]	3.60	4.45	3.40	3.588	3.35	3.85	5.806	6.856	6.65	7.75
Buffalo	3.35	4.40	4.754	3.819	4.669	3.63	3.40	3.35	3.85	5.60	6.65	6.65	7.75
Detroit	3.45	4.50	5.004	3.70	4.859[17]	3.609	3.661	3.45	3.90	5.93	6.98	6.959	8.059
Cincinnati	3.425	4.475[3]	4.825[5]	3.675	4.711	3.661	3.691	3.611	4.111	5.95	7.00	7.011	8.261
St. Louis	3.397	4.347[3]	5.172[4]	3.747	4.931[17]	3.697	3.697	3.647	4.131	5.981	7.031	7.031	8.131
Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.85	5.60	6.65	6.65	7.90
St. Paul	3.50	4.46	5.257[4]	3.86	5.102[17]	3.813[3]	3.813[3]	3.763[3]	3.461	5.94	5.99	7.361	8.461
Omaha	3.865	5.443	5.608[4]	4.215	....	4.165	4.165	4.115	4.543	....	....	....	....
Indianapolis	3.518	4.568	4.918	3.768	4.741	3.63	3.63	3.58	4.00	5.93	6.98	6.98	8.23
Birmingham	3.45	....	4.75	3.70	....	3.55	3.55	3.50	4.53	....	....	....	....
Memphis	3.965[7]	4.66	5.268	4.215	....	4.065	4.065	4.015	4.33	....	....	....	....
New Orleans	4.058*	5.079	5.358	4.308	....	4.158	4.158*	4.108*	4.729	....	....	....	....
Houston	3.763	5.573	6.313[1]	4.313	....	4.25	4.25	3.75	6.473[3]	7.223	8.323	8.323	9.373
Los Angeles	5.00	7.203	6.104	4.95	5.613[15]	4.95	4.65	4.40	5.663	8.204	9.404	9.304	10.454
San Francisco	4.55[14]	7.304	6.354	4.50[14]	7.333[17]	4.65[14]	4.35[14]	4.15[14]	5.433	8.304	9.404	9.404	10.454
Seattle	4.65[12]	7.054	5.954	4.25[12]	....	4.75[12]	4.45[12]	4.35[12]	5.883	....	9.404	....	....
Portland	4.65[11]	6.604	5.754	4.75[11]	....	4.85[11]	4.45[11]	4.45[11]	5.633	8.304	9.404	8.304	9.404
Salt Lake City	4.530[17]	....	6.171[3]	5.53[17]	....	4.98[17]	4.98[17]	4.88[17]	6.00	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1499 lb; strip, extras on all quantities; bars, 1500 lb base.

NE ALLOY BARS: 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 199 lb. (7) 400 to 1499 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb and over. (15) 1000 lb and over. (16) 1500 lb and over. (17) 2000 lb and over. (18) 3500 lb and over.

(a) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

*Add 0.271¢ for sizes not rolled in Birmingham.

**City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

PIG IRON PRICES

Maximum per gross ton, established by OPA Oct. 22, 1945. Prices do not reflect 3 pct tax on freight.

BASING POINT PRICES

Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	$26.25	$26.75	$27.25	$27.75	....
Birdsboro	26.25	26.75	27.25	27.75	$31.25
Birmingham	20.75	22.13	....	26.75	....
Buffalo	24.75	25.75	26.25	26.75	31.25
Chicago	25.25	25.75	25.75	26.25	....
Cleveland	25.25	25.75	25.75	26.25	....
Detroit	25.25	25.75	25.75	26.25	....
Duluth	25.75	26.25	26.25	26.75	....
Erie	25.25	25.75	26.25	26.75	....
Everett	26.25	26.75	27.25	27.75	....
Granite City	25.25	25.75	25.75	26.25	....
Hamilton	25.25	25.75	25.75	....	....
Neville Island	25.25	25.75	25.75	26.25	....
Provo	23.25	23.75	....	....	....
Sharpsville [1]	25.25	25.75	25.75	26.25	....
Sparrows Point	26.25	26.75	....	....	....
Steelton	26.25	....	....	....	31.25
Swedeland	26.25	26.75	27.25	27.75	....
Toledo	25.25	25.75	25.75	26.25	....
Youngstown	25.25	25.75	25.75	26.25	....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$ .50	$26.75	$27.25	$27.75	$28.25	....
Boston	Birdsboro-Steelton	4.02	....	....	....	....	$35.27
Brooklyn	Bethlehem	2.50	28.75	29.25	29.75	30.25	....
Brooklyn	Birdsboro	2.92	....	....	....	....	34.17
Canton	Cleveland	1.39	28.64	27.14	27.14	27.64	....
Canton	Buffalo	3.19	....	....	....	....	34.44
Cincinnati	Birmingham	4.06	24.81	26.19	....	....	....
Cincinnati	Hamilton	1.11	....	....	26.86	....	35.66
Cincinnati	Buffalo	4.40	....	....	....	....	....
Jersey City	Bethlehem	1.53	27.78	28.28	28.78	29.28	....
Jersey City	Birdsboro	1.94	....	....	....	....	33.19
Los Angeles	Provo	4.95	28.20	28.70	....	....	....
Los Angeles	Buffalo	15.41	....	....	....	....	46.66
Mansfield	Cleveland & Toledo	1.94	27.19	27.69	27.69	28.19	....
Mansfield	Buffalo	3.36	....	....	....	....	34.63
Philadelphia	Swedeland	.84	27.09	27.59	28.09	28.59	....
Philadelphia	Birdsboro	1.24	....	....	....	....	32.49
San Francisco	Provo	4.95	28.20	28.70	....	....	....
San Francisco	Buffalo	15.41	....	....	....	....	46.66
Seattle	Provo	4.95	28.20	28.70	....	....	....
Seattle	Buffalo	15.41	....	....	....	....	46.66
St. Louis	Granite City	.50	28.75	28.25	28.25	28.75	....
St. Louis	Buffalo	7.07	....	....	....	....	38.32

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50¢ a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, $33.00 and $34.00, respectively. Newberry Brand of Lake Superior charcoal iron $39.00 per g.t., f.o.b. furnace, by order L 39 to RPS 10. Apr. 11, 1945, retroactive to Mar. 7, 1945. Delivered to Chicago, $42.34. High phosphorus iron sells at Lyles, Tenn., at $28.50.

Basing point prices are subject to switching charges; Silicon differentials (not to exceed 50¢ a ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); Phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; Manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. Effective Mar. 3, 1943, $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron and bessemer ferrosilicon up to and including 14.00 pct silicon covered by RPS 10 as amended Feb. 14, 1945. Silvery iron, silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$30.50; f.o.b. Buffalo—$31.75. Add $1.00 per ton for each additional 0.50 pct Si. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for prices of comparable analysis.

Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	148.50
F.a.b. Pittsburgh	139.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Ferromanganese Briquets

Contract prices per pound of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 66% contained Mn. Add 0.25¢ for spot sales.

	Eastern	Central	Western
Carload, bulk	6.05¢	6.30¢	6.60¢
Ton lots	6.65¢	7.55¢	8.55¢
Less ton lots	6.80¢	7.80¢	8.80¢

Manganese Metal

Contract basis, lump size, per pound of metal, f.o.b. shipping point with freight allowed. Spot sales add 2¢ per lb.

96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30¢
L.c.l. lots	32¢

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	34¢
Ton lots	36¢
Less ton lots	38¢

Spiegeleisen

Maximum base contract prices per gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$35.00	$36.00
Less ton	47.50	48.50
F.o.b. Pittsburgh, Chicago	40.00	

Low-Carbon Ferromanganese

Contract prices per pound of manganese contained, lump size, f.o.b. shipping point, freight allowed to destination, eastern zone. Add 0.25¢ for spot sales.

	Carloads, Ton Bulk	Lots	Less Ton
0.06% C, 0.06% P, 90% Mn	23.00¢	23.40¢	23.65¢
0.10% max. C, 1% or 2% max. Si	23.00¢	23.40¢	23.65¢
0.15% max. C, 1% or 2% max. Si	22.00¢	22.40¢	22.65¢
0.30% max. C, 1% or 2% max. Si	21.00¢	21.40¢	21.65¢
0.50% max. C, 1% or 2% max. Si	20.00¢	20.40¢	20.65¢
0.75% max. C, 7.00% max. Si	16.00¢	16.40¢	16.65¢

Electric Ferrosilicon

OPA maximum base price cents per pound contained Si, lump size in carloads, f.o.b. shipping point with freight allowed.

	Eastern	Central	Western
50% Si	6.65¢	7.10¢	7.25¢
75% Si	8.05¢	8.20¢	8.75¢
80-90% Si	8.90¢	9.05¢	9.35¢
90-95% Si	11.05¢	11.20¢	11.65¢

Silvery Iron

Si 14.01 to 14.50%, $45.50 per G. T. f.o.b. Jackson, Ohio. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%. Covered by MPR 405.

Silicon Metal

OPA maximum base price per pound of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb, packed. Add 0.25¢ for spot sales.

	Eastern	Central	Western
96% Si, 2% Fe	13.10¢	13.55¢	16.50¢
97% Si, 1% Fe	13.45¢	13.90¢	16.80¢

Ferrosilicon Briquets

OPA maximum base price per pound of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add 25¢ for spot sales.

	Eastern	Central	Western
Carload, bulk	3.35¢	3.50¢	3.65¢
2000 lb-carload	3.80¢	4.20¢	4.25¢

Silicomanganese

Contract basis lump size, per pound of metal, f.o.b. shipping point with freight allowed. Add 25¢ for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05¢
2000 lb to carload	6.70¢
Briquet, contract basis, carlots, bulk freight allowed, per lb	5.80¢
2000 lb to carload	6.30¢
Less ton lots	6.55¢

Ferrochrome

(65-72% *Cr*, 2% *max. Si*)

OPA maximum base contract prices per pound of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add 0.25¢ per lb contained Cr for spot sales.

	Eastern	Central	Western
0.06% C	23.00¢	23.40¢	24.00¢
0.10% C	22.50¢	22.90¢	23.50¢
0.15% C	22.00¢	22.40¢	23.00¢
0.20% C	21.50¢	21.90¢	22.50¢
0.50% C	21.00¢	21.40¢	22.00¢
1.00% C	20.50¢	20.90¢	21.50¢
2.00% C	19.50¢	19.90¢	21.00¢
66-71% Cr, 4-10% C	13.00¢	13.40¢	14.00¢
62-66% Cr, 5-7% C	13.50¢	13.90¢	14.50¢

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low-carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 5¢ per lb to regular high-carbon ferrochrome price schedule.

Ferrochrome Briquets

Contract prices per pound of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 60% contained chromium. Add 0.25¢ for spot sales.

	Eastern	Central	Western
Carload, bulk	8.25¢	8.55¢	8.95¢
Ton lots	8.75¢	9.25¢	10.75¢
Less ton lots	9.00¢	9.50¢	11.00¢

Calcium—Manganese—Silicon

Contract prices per pound of alloy, lump size, f.o.b. shipping point, freight allowed to destination.

16-20% Ca, 14-18% Mn, 53-59% Si. Add 0.25¢ for spot sales.

	Eastern	Central	Western
Carloads	15.50¢	16.00¢	18.05¢
Ton lots	16.50¢	17.35¢	19.10¢
Less ton lots	17.00¢	17.35¢	19.60¢

Calcium Metal

Eastern zone contract prices per pound of metal, f.o.b. shipping point, freight allowed to destination. Add 5¢ for spot sales. Add 0.9¢ for central zone; 0.49¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	$1.80	$2.30	$5.00
Less ton lots	2.30	2.80	5.75

Chromium—Copper

Contract price per pound of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si. Add 2¢ for spot sales.

Shot or ingot	45¢

Ferroboron

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed to destination. Add 5¢ for spot sales. 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Ton lots	$1.20	$1.2075	$1.229
Less ton lots	1.30	1.3075	1.329

Manganese—Boron

Contract prices per pound of alloy, f.o.b. shipping point, freight charges allowed. Add 5¢ for spot sales.

75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

	Eastern	Central	Western
Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron

Spot and contract prices per pound of alloy, f.o.b. shipping point, freight allowed to destination.

15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

	Eastern	Central	Western
11,200 lb or more	$1.90	$1.9125	$1.9445
Ton lots	2.00	2.09125	2.0445
Less ton lots	2.10	2.1125	2.1445

Other Ferroalloys

Ferrotungsten, standard grade lump or ¼X down, packed f.o.b. plant at Niagara Falls, New York, Washington, Pa., York, Pa., per pound contained tungsten, 10,000 lb or more	$1.90
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, usual freight allowances, per pound contained V.	
Openhearth	$2.70
Crucible	$2.80
Primos	$2.90
Cobalt, 97% min., keg packed, contract basis, f.o.b. producers plant, usual freight allowances, per pound of cobalt metal	$1.50
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, any quantity, per pound contained V_2O_5. Spot sales add 5¢ per lb contained V_2O_5	$1.10
Silcaz No. 3, contract basis, f.o.b. plant with usual freight allowances, per pound of alloy.	
Carload lots	25¢
2000 lb to carload	26¢
Silvaz No. 3, contract basis, f.o.b. plant with freight allowances, per pound of alloy.	
Carload lots	58¢
2000 lb to carload	59¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb and over, max. based on rate to St. Louis	
No. 1	87.5¢
No. 6	60¢
No. 79	45¢
Bortram, f.o.b. Niagara Falls	
Ton lots, per lb	45¢
Less ton lots, per lb	50¢
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per pound contained Cb.	
2000-lb lots	$2.25
Under 2000-lb lots	$2.30
Ferrotitanium, 40-45%, 0.10%C. max. f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Less ton lots	$1.25
Ferrotitanium, 20-25%, 0.10%C. max., ton lots, per pound contained titanium	$1.35
Less ton lots	$1.40
High-carbon ferrotitanium, 15-20%, 6-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y. freight allowed east of Mississippi, north of Baltimore and St. Louis, per carload	$142.50
Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per pound contained Mo	95¢
Calcium molybdate, 40-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per pound contained Mo	80¢
Molybdenum oxide briquets, 48-52% Mo f.o.b. Langeloth, Pa., per pound contained Mo	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo	80¢
Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per pound of alloy. Add ¼¢ for spot sales	
Carload lots	14¢
Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per pound of alloy	
Carload, bulk	4.60¢
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk	5.75¢
Ton lots	7.25¢
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per pound.	
Car lots	8.00¢
Ton lots	8.75¢
Less ton lots	9.25¢

Comparison of Prices . .

Advances over past week in **Heavy Type**; declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	Nov. 13, 1945	Nov. 6, 1945	Oct. 9, 1945	Nov. 14, 1944
Hot-rolled sheets	2.20	2.20	2.20	2.10
Cold-rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.70	3.70	3.70	3.50
Hot-rolled strip	2.10	2.10	2.10	2.10
Cold-rolled strip	2.80	2.80	2.80	2.80
Plates	2.25	2.25	2.25	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c-r strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes.	$5.00	$5.00	$5.00	$5.00
Tinplate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.25	2.25	2.25	2.15
Cold-finished bars	2.75	2.75	2.75	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302).	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40
Wire and Wire Products: (cents per pound)				
Bright wire	2.75	2.75	2.75	2.60
Wire nails	2.90	2.90	2.90	2.55
Rails: (dollars per gross ton)				
Heavy rails	$43.00	$43.00	$43.00	$40.00
Light rails	45.00	45.00	45.00	40.00
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$36.00	$36.00	$36.00	$34.00
Sheet bars	36.00	36.00	36.00	34.00
Slabs, rerolling	36.00	36.00	36.00	34.00
Forging billets	42.00	42.00	42.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.15	2.15	2.15	2.00
Skelp	1.90	1.90	1.90	1.90

Pig Iron: (per gross ton)	Nov. 13, 1945	Nov. 6, 1945	Oct. 9, 1945	Nov. 14, 1944
No. 2 foundry, Phila.	$27.59	$27.59	$26.84	$25.84
No. 2, Valley furnace	25.75	25.75	25.00	24.00
No. 2, Southern, Cin'ti	26.19	26.19	25.44	24.44
No. 2, Birmingham	22.13	22.13	21.38	20.38
No. 2 foundry, Chicago†	25.75	25.75	25.00	24.00
Basic, del'd eastern Pa.	27.09	27.09	26.34	25.34
Basic, Valley furnace	25.25	25.25	24.50	23.50
Malleable, Chicago†	25.75	25.75	25.00	24.00
Malleable, Valley	25.75	25.75	25.00	24.00
L. S. charcoal, Chicago.	42.34	42.34	42.34	37.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$16.25
Heavy melt'g steel, Phila.	18.75	18.75	18.75	15.50
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	16.50
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	12.00
Low phos. plate, Youngs'n	22.50	22.50	22.50	17.75
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$7.50	$7.50	$7.50	$7.00
Foundry coke, prompt	9.00	9.00	9.00	8.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00
Tin, Straits, New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, virgin, del'd	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943 issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

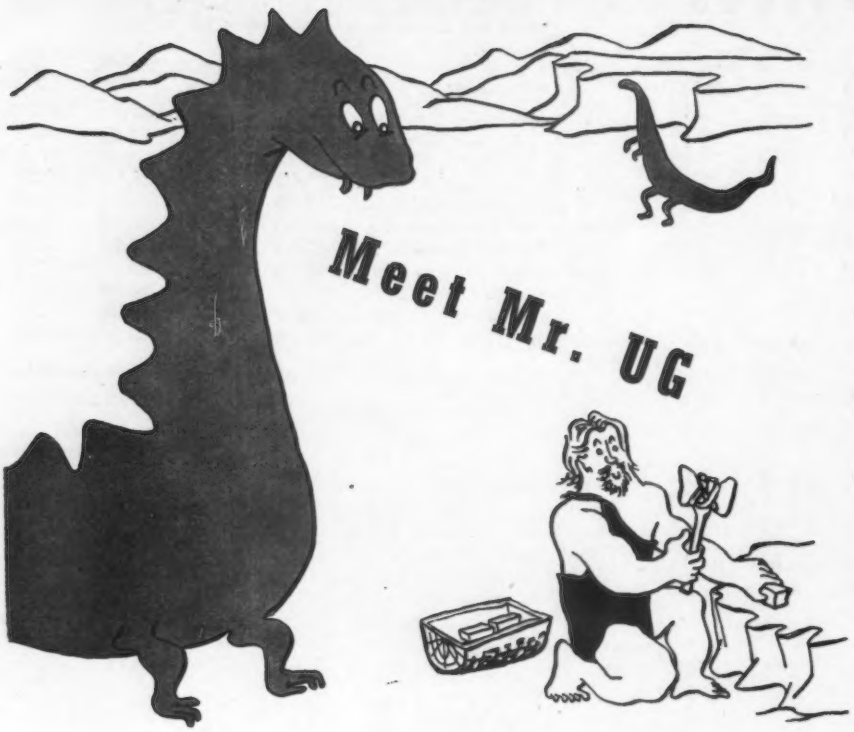
	FINISHED STEEL	PIG IRON	SCRAP STEEL
Nov. 13, 1945	2.42471¢ per lb.	$25.37 per gross ton.	$19.17 per gross ton.
One week ago	2.42471¢ per lb.	$25.37 per gross ton.	$19.17 per gross ton.
One month ago	2.42471¢ per lb.	$24.61 per gross ton.	$19.17 per gross ton.
One year ago	2.21189¢ per lb.	$23.61 per gross ton.	$16.08 per gross ton.

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1945	2.42471¢ July 3	2.21189¢ Jan. 2	$25.37 Oct. 23	$23.61 Jan. 2	$19.17	$19.17
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17	$15.67 Oct. 24
1943	2.25513¢	2.25513¢	23.61	23.61	19.17	$19.17
1942	2.26190¢	2.26190¢	23.61	23.61	19.17	19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 8
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 9
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 3

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941 issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.



Mr. Ug led *a* hard life in many ways—but he had the advantage over you in *one* respect. He didn't have to worry about keeping metals clean!

You can make that job easier, though, by using Wyandotte Metal Cleaners. One of these specialized, labor-saving products will meet almost any metal cleaning need—for cleaning after machining and prior to plating, painting, lacquering, blackening, anodizing or spot welding.

Always ready to help you put these products to work is the Wyandotte Field Engineer. Consult him at any time about your particular problem and ask his advice about your plans for future expansion.

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Wartime Expansion In U. S. Aluminum Capacity To Be 50 Pct Surplus

Washington

• • • **The war history** of aluminum is the record of a successful race to expand facilities fast enough to meet the multiple increases in military requirements, principally for aircraft, according to J. A. Krug in his report on war production. From the beginning of the defense program in 1940, requirements estimates were repeatedly lifted to new high levels, and plans for increasing capacity had to be constantly revised. In 1943, basic metal supply caught up with and exceeded requirements and by 1944 the surplus of primary production was large enough to force cutbacks in output and plant closings.

In 1938 there was only one U. S. producer of primary aluminum (which was also the major fabricator), operating four reduction plants with an annual capacity of 300 million lb. Secondary recovery was less than 100 million lb, and the total fabricating facilities in the country were barely adequate to process the available metal. When the wartime expansion program was completed, installed ingot capacity was 2.3 billion lb per yr, secondary recovery had increased six-fold; and the fabricating system had an annual machine capacity of approximately 2.6 billion lb.

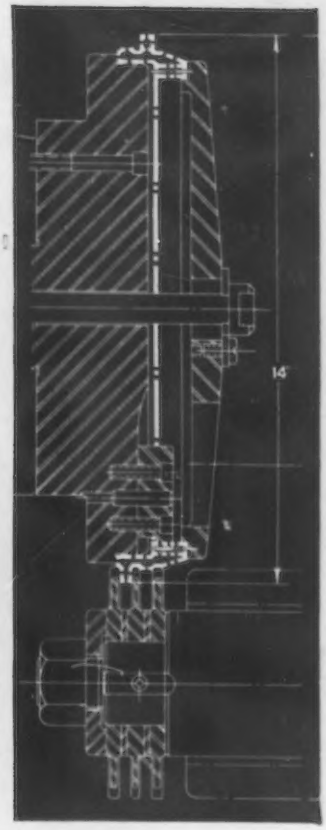
As a result of this expansion approximately 42 pct of the world's total installed primary capacity is now concentrated in the United States, and the domestic fabricating system is by far the largest in the world. By even the most optimistic estimates of postwar demand, 50 pct of our capacity is surplus for commercial operations, and the potential effects on the world industry resulting from the ultimate disposition of government-owned facilities are far reaching.

The impact of military requirements broke suddenly on the industry. As a result of its overall expansion program from 1937 to 1939, Alcoa was judged at the time in a position to meet all foreseen demands, including normal increases in domestic civilian consumption, the British and French plane procurement programs as then determined, and our own 1939 military plane schedule of 2100 aircraft.

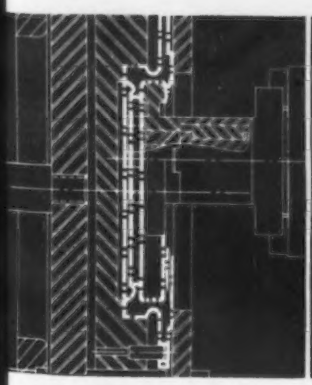
Even in May 1940, when the President's message to Congress called for a production goal of 50,000 planes per

(CONTINUED ON PAGE 140)

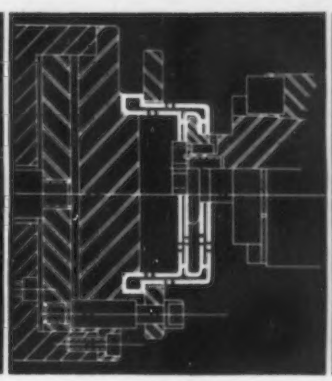
AND THREADING



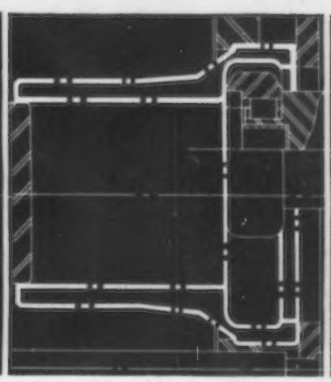
External operations with interrupted cuts are finished to close tolerances with the Cross Rotary Miller.



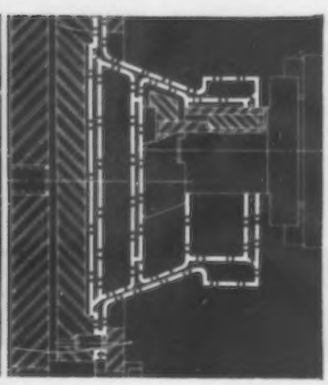
Rotary milling is an ideal method for handling many difficult operations on aircraft parts.



Multiple edge cutting tools with an enveloping cutting action satisfy the most exacting demands for fine finish.



Deep internal contours can be finished in one operation with the Cross Machine.



Irregular contours are processed in the usual way without special attachments or tooling.

SPECIAL MACHINES

for automatically performing any one or a combination of metal cutting operations
TURNING · MILLING · DRILLING · BORING · REAMING · TAPPING · GRINDING

New Keyless Chuck
does its own drill tightening

THE TURNER CHUCK *Saves Time!*

Hardened bearing steel roller jaws grip the drill without chewing or scoring.

Grip is automatically and progressively strengthened with increased load pressure

Roller bearings increase life.

Absolutely KEYLESS. No more chewed drill shanks. No more time wasted looking for keys.

The Turner Chuck is self-energizing. Tightens itself by the action of the drill.

Drill will not slip in use. Chuck is automatically self-centering and drill runs true without hand adjustments.

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THE SINGLE STYLE TURNER CHUCK IS AVAILABLE IN:

4 DRILL CAPACITIES

A-1/32 to 1/16 DRILL
B-1/16 to ⅛ DRILL
C-⅛ to ¼ DRILL
D-¼ to ½ DRILL

3 BODY SIZES

15/16 x 1¾
15/16 x 1¾
1½ x 2½
2¼ x 3¾

NEWS OF INDUSTRY

(CONCLUDED FROM PAGE 130)

yr, there was no indication of an immediate aluminum shortage. After the announcement of the plane objective, the War Dept. estimated requirements for the next two years at 513 million lb for the services (including material for 31,336 planes) and 530 million lb for civilian usage, a total of 1043 million lb. Alcoa estimated new supply for the same period at 878 million lb of primary and 140 million of secondary. Adding in stocks of 90 million lb brought total supply to more than 1100 million lb.

By drawing on stocks, therefore, demand could be met. But with further demand increases in prospect, a drive for facilities expansion was begun. It was argued that military requirements were underestimated, that achievement of the 50,000-plane objective could not be met from Alcoa's planned expansion, and that both ingot and fabricating facilities soon would be in critically short supply. Throughout the remainder of 1940, aircraft requirements were constantly revised—always upward—and the successive balance sheets began to show substantial cuts in the amount available for civilian consumption.

At this point, the race started between expanding facilities and expanding requirements. In August 1940, Reynolds Metals Co. received an RFC loan to construct an alumina and aluminum plant of 60 million lb annual capacity, to begin operations in 1941. From a capacity of 450 million lb as of October 1940, Alcoa announced planned expansions to a peak of 690 million lb by July 1942. By the end of 1940, however, it was evident that these contemplated expansions would not be in operation in time to meet visible military demands and a mounting uncontrolled civilian demand.

Military requirements had been underestimated for a number of reasons, including: Use of the finished weight of the end items, e.g., aircraft, as base rather than bills of material including necessary scrap losses; failure to include allowances for filling pipelines in the expanding aluminum fabricating and consuming plants; failure to allow for spoilage resulting from operations of inexperienced labor and management.

By April 1941, recast requirements based on the aircraft program as then projected showed an annual deficit of 310 million lb at peak demand level, assuming the completion on time of the scheduled expansion of production. To meet this deficit, OPM first planned an expansion program of 200 mil-

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lion lb in Alcoa facilities, supported by 200 million lb of imports from Canada. Before anything could be accomplished on this program, requirements again were lifted to a new peak of 1640 million lb per year, including aircraft at 900 million (4000 planes monthly), other military demand at 300 million, and civilian at 440 million. Annual supply, actual and in sight, was estimated at 1040 million lb. Thus, the peak annual indicated deficit at the end of April 1941, was 600 million lb.

To carry this load, the decision was made to add another 400 million lb to the government-financed expansion program, bringing total planned production to 1400 million lb. This, with Canadian shipments, would balance the demand load, on paper. Alumina capacity of 1200 million lb was provided for—400 million to be operated by Reynolds and 800 million by Alcoa; carbon electrode capacity was to be expanded, bauxite production and imports increased, cryolite imports stepped up, and a synthetic cryolite plant constructed.

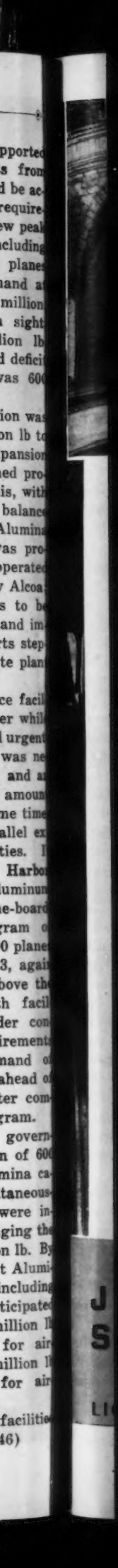
As a stop-gap measure, since facility expansion was still on paper while requirements were current and urgent, a contract for 375 million lb was negotiated with Canada in May and an additional contract for a like amount was signed in July. At the same time plans were made for the parallel expansion of fabricating facilities. It was anticipated before Pearl Harbor that by the middle of 1942 aluminum would be in balance across-the-board.

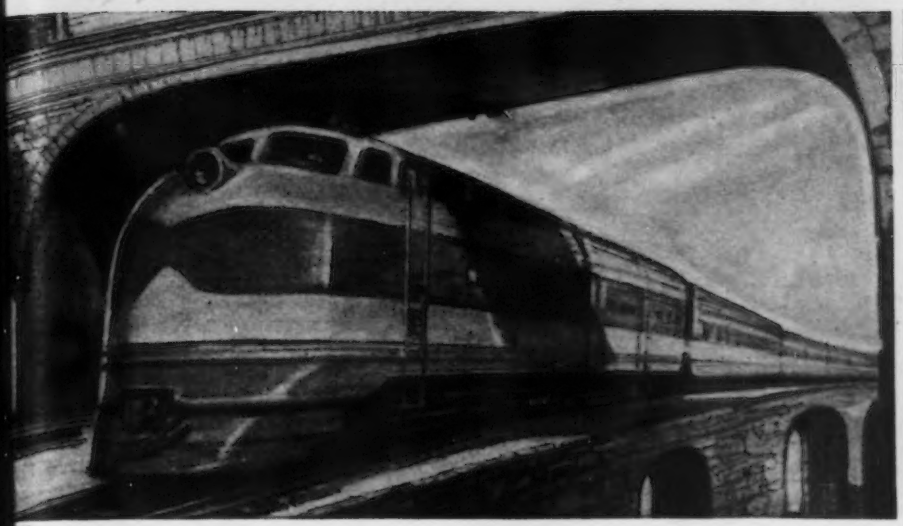
The President's war program of January 1942, calling for 60,000 planes that year and 125,000 in 1943, again raised future requirements above the supply anticipated from both facilities-in-being and those under construction. Estimates of requirements indicated peak military demand of 2600 million lb annually, far ahead of the output to be realized after completion of first expansion program.

In February, an additional government-financed ingot expansion of 600 million lb, with balanced alumina capacity, was approved. Simultaneously, the Canadian contracts were increased by 250 million lb, bringing the total under contract to 1 billion lb. By the end of February, the Joint Aluminum Committee's report (including the 8-I Aircraft Program) anticipated total requirements of 1600 million lb (including 1400 million lb for aircraft) for 1942, and 2700 million lb (including 2400 million lb for aircraft) in 1943.

By the middle of 1942, the facilities

(CONTINUED ON PAGE 146)





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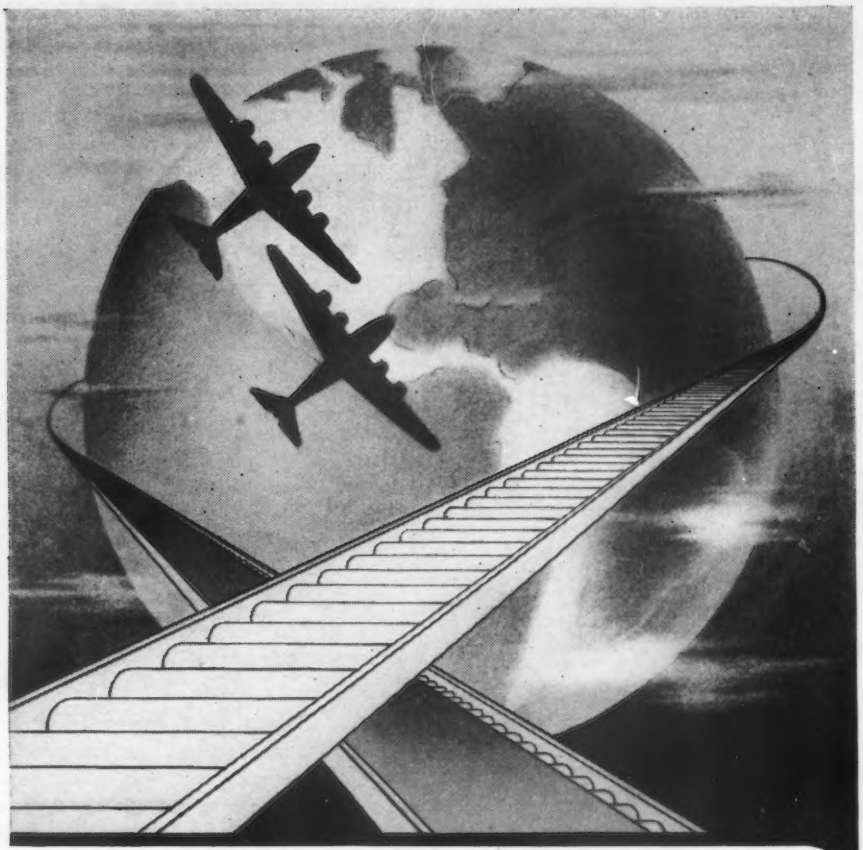

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(CONTINUED FROM PAGE 142)

in the first expansion program had started operations, and construction of the second program, including fabricating plants to balance the ingot expansion, was well underway. Although during 1942, and even in 1943, additional fabricating capacity was added as military demand fluctuated or specifications shifted (for example, forged instead of cast cylinder heads), the expansions approved by February 1942, were the base for the aluminum system as it is today. In March 1942, the two Canadian contracts were superseded by a new contract for one billion lb (to be delivered by December 1944), supplemented in April by an additional contract for 370 million lb (to be delivered by December 1945). By means of the expansion programs and the Canadian contracts, it was believed that the aluminum shortage would be licked.

By early 1943 the outcome of the facility-requirements race was clear. We were in balance overall, and the problems ahead were all associated with the shifting impacts of requirements for fabricated shapes. The nature of the problem is illustrated by the 1943 situation in extrusions. The B-29 program scheduled for fall production called for a large increase in extruded shapes. The resultant shortage in capacity affected tubing (through the cutback in tube bloom production), extruded rod and bar, and forgings (because of the shortage of rod and bar forge stock, necessitating a scheduling procedure for forgings). An expansion in extrusion facilities was immediately started to meet this squeeze. By the middle of the year, the B-29 program had been rescheduled because, regardless of the aluminum extrusion supply, the original schedule could not be met. It also became evident that peak requirements had been overstated, and a substantial portion of the expansion program in extrusions was canceled.

A sheet shortage was indicated for the second quarter and it was proposed to utilize steel sheet capacity to roll aluminum as temporary relief. Sheet demand, however, did not reach the projected high levels until the end of the year, when adequate aluminum rolling facilities were available.

The conversion of cylinder head specifications from castings to forgings necessitated a rapid increase in facilities, and the larger castings required by the super-bombers and giant transport planes called for an increase in sand casting capacity.

By the end of 1943, however, the only major problem left in the indus-

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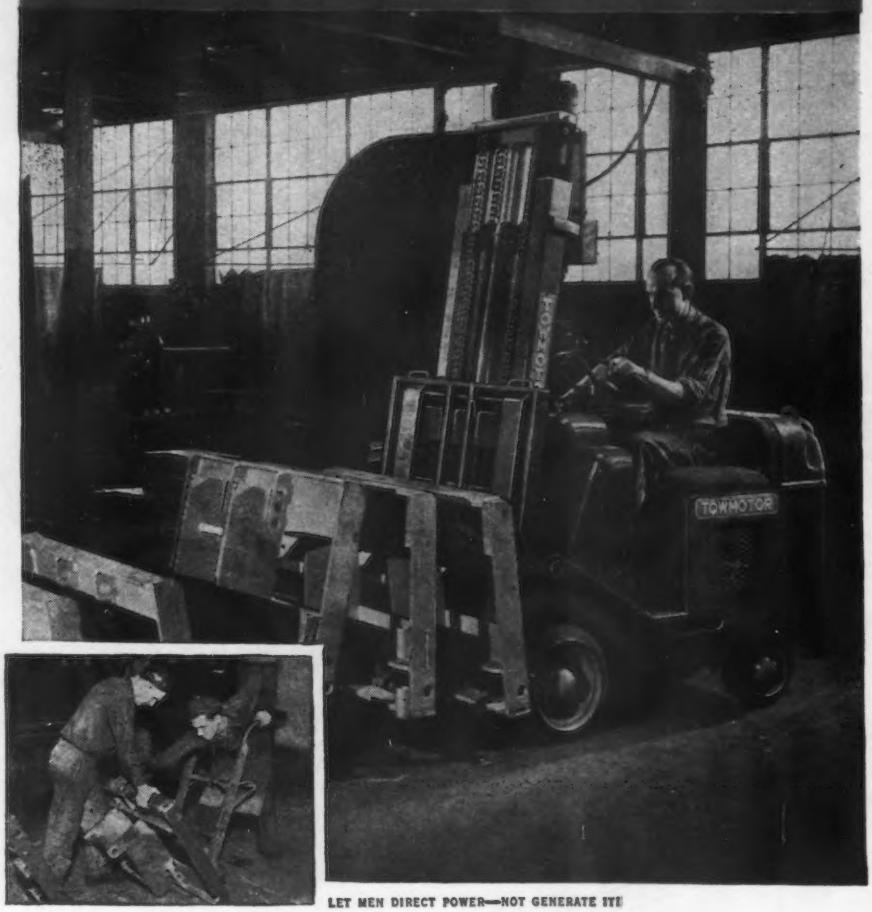

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try was a manpower shortage. It was anticipated that in 1944 it would be possible to balance supplies and requirements for all fabricated products. The 1944 metal supply, as then estimated, was well in excess of anticipated fabricating needs, the industry was in an excess working inventory position, and government stocks approximated 168 million lb.

Therefore, the first step was taken in the curtailment program, and four of the 35 DPC lines in operation were closed as of the first of the year. Alcoa also closed 88.5 million lb of privately-owned capacity in its first cutback.

Operations in 1944 were characterized by the continuing cutbacks in ingot and alumina production, the depipelining of the aluminum system, and actual demands on fabricating plants well below the anticipated levels upon which the aluminum expansion program had been based. This was due primarily to three factors: Lowered and more realistic requirements, based on greatly improved bills of material; inventory absorption in consuming plants; and lower schedules for aircraft, reflecting a lower than expected plane mortality rate.

In the summer after the European invasion, the indicated surplus position of aluminum induced relaxation of controls, as a part of the "Nelson Program" to give reconversion a start. Despite the curtailment in production, which by November had closed slightly more than half of the installed ingot capacity and had reduced output to 1.1 billion lb a year (the rate reached in July 1942), government stocks had increased rapidly. Therefore, it was agreed to postpone for an indefinite period the remainder of 250 million lb due on the Canadian contracts in 1945. By the end of the year, reserve stocks had reached 565 million lb. (Following up the curtailment program, three plants with a total capacity of 504 million lb were declared surplus, one of which — Queens—has been dismantled.)

Aircraft requirements and shipments declined throughout 1944. Ground Army and Navy requirements and shipments, however, showed an uptrend. The increased take was due largely to stepped-up ammunition programs, the partial substitution of aluminum for steel in landing mats, and the rapid acceleration in the use of atomized powder for explosives and of foil for packaging and anti-radar use. Deliveries to Russia and the United Kingdom also showed large increases. As a result of the

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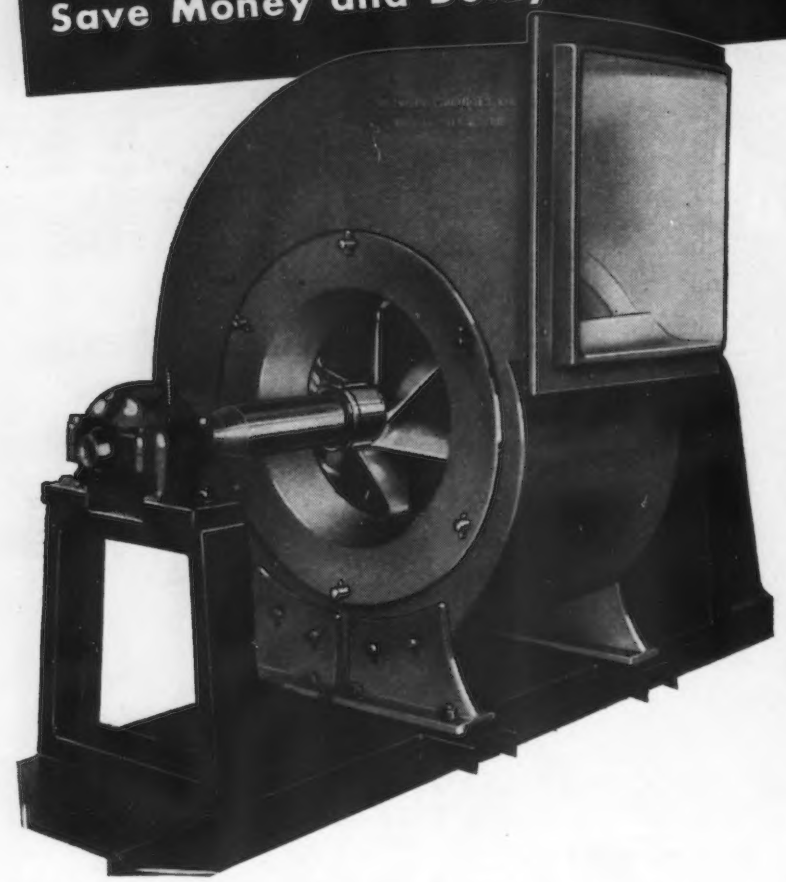

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relaxation of controls, civilian deliveries on both a firm and deferred basis were more than 50 pct higher than in 1943.

The final descent-and-climb in requirements began in the last quarter of 1944. Aircraft shipments fell off to the level of the fourth quarter of 1942 (260 million lb). This was due not only to lower aircraft schedules, but also to the very heavy year-end inventory absorption. As a result, the labor force in the aluminum mills was cut down and the entire industry was operating at a low level.

In December 1944, aircraft schedules for 1945 were revised sharply upward and, in view of the depleted inventory position in consuming plants, the full requirements for the first quarter of 1945 were carried through to the mill order books. Shortages again developed in the early months of 1945 in all products except tubing—particularly in sheet, foil, and extrusions. These shortages were due solely to lack of manpower, which had been lost in the previous quarter. Powder requirements continued the uptrend initiated in 1944; foil demand for both radar and packaging use was increased well beyond the available facilities; and the Army bridge program was initiated, which competed with the accelerated aircraft requirements for extrusion capacity. It was apparent that civilian orders on an unrated basis would be frozen out of mill schedules.

Every effort was made to obtain manpower, including the furloughing of soldiers to sheet mills; extrusion capacity was increased; and United Kingdom demands for foil and powder were diverted to capacity in Canada. The industry was forced to repipeline to meet the accelerating demand, and government stocks were reduced to 337 million lb by the end of the first quarter. The postponed balance of 250 million lb from Canada was adjusted to 169 million lb and rescheduled, and efforts were made to reopen domestic potlines to avert the impending ingot shortage. Since these efforts were largely unsuccessful because of the overall manpower situation, a new Canadian contract for 250 million lb was signed in March.

First quarter shipments of fabricated products, despite the difficulties encountered, reached an all-time peak of 627 million lb, and second quarter operations were scheduled at the same level. Aside from attempts to increase ingot supply, the only shortage expected in the second quarter was in

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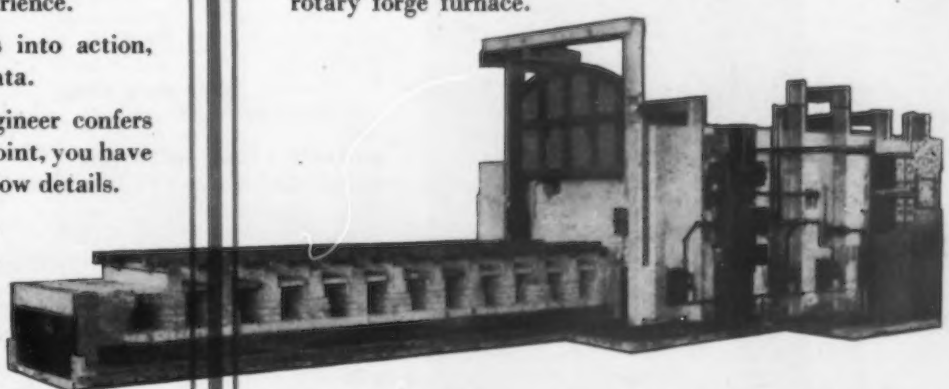

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foil and extrusion capacity, resulting from the acceleration of the packaging and bridge programs. By May, ARCO again cut back its program, thus releasing capacity, and the March contract with Canada was reduced to 75 million lb. Prior to VJ-Day, further cuts in ARCO programs removed pressure from all shapes.

Aluminum was the first basic production material to require overall distribution controls. Before the metal was absorbed into the CMP system in the second quarter of 1943, its distribution was accomplished through what was probably the most detailed and comprehensive allocation procedure ever developed for any material in general use.

The need for the institution of controls was first felt early in 1941, when aircraft producers and aluminum fabricators were unable to obtain adequate supplies to meet their schedules. The initial steps were the issuance of two orders: M-1, which brought all aluminum operations under control; and M-1-a, which established a preference rating schedule. Aluminum producers were required to maintain records and furnish monthly reports on orders and deliveries, as requested. Although only incomplete data are available through the last quarter of 1941, aluminum producers, beginning with 1942, regularly have filed detailed reports, and the available statistical series on aluminum operations are probably more comprehensive than for any other material. Defense orders (including U.K.) were assigned A preference ratings, while non-defense orders were rated in the B series and were restricted to a percentage of 1940 use, scaled in order of essentiality.

The rapidly developing imbalance of aluminum supply and demand forced successive revisions in and additions to the controls. The M-1 orders, first issued as a temporary measure, were extended to the end of 1941. Beginning in July, all non-defense orders were submitted for review by the joint WPB-military Aluminum and Magnesium Priority Committee and were filled only after approval. The pyramiding of new requirements was making it clear, however, that control through a preference rating sequence was inadequate.

Two major steps were taken to resolve the difficulty. First, early in 1942, M-1-e was issued, representing the most drastic measure of its type attempted to that date. The order listed only 15 permitted uses for aluminum;

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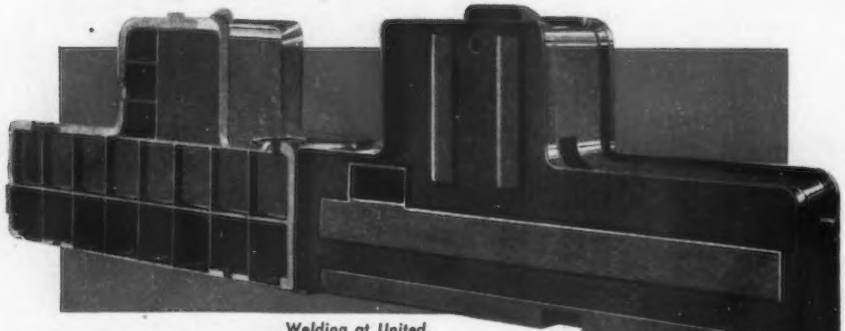

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all uses not listed were forbidden. The problem of inadequate supply even for permitted uses remained, however, and called for a second step, taken in the issuance of M-1-f. Under this order each aluminum producer and fabricator was required to file a monthly shipping schedule, including for each order information on the manufacturing use of the material to be shipped and the end use of the fabricated product. Delivery could be made only after specific authorization. This order-by-order screening was supported by a supply-requirements balance effected through the Joint Aluminum Committee and a "pie cut" to claimants. Screening of order boards insured that no claimant exceeded its allocation. Further development of this comprehensive allocation system in the latter part of 1942 was halted by the projection of CMP.

Toward the end of 1943 and in the early months of 1944, as supply eased, the controlling orders were relaxed and in August 1944, as part of the four-part reconversion program, all restrictions on use were removed.

In the case of aluminum, the problem is not one of a shortage for reconversion; it is a problem of surplus. As of VJ-Day, primary plants were operating at an annual rate of approximately one billion lb, or less than half of capacity (400 million lb from DPC lines, the balance from privately owned capacity); secondary recovery was at an annual rate of 650 million lb; and the deliveries on the Canadian contract had been completed. The estimated government stockpile approximated 400 million lb, and overall metal stocks within the industry, as a result of the repipelining in the first half of this year, was in the neighborhood of 700 million lb.

Youngstown Net Declines

Youngstown

• • • **The Youngstown Sheet & Tube Co.** for the third quarter of this year reports a net income of $1,697,943 compared with a net profit in the third quarter of 1944 of $1,818,768. Net sales and revenues less cost of sales and other expenses for the third quarter amounted to $7,118,831. A sum of $1,380,000 representing premium on bonds called for retirement was included in the third quarter 1945 income statement.

Get *Your* Finishing Department in Production FASTER with a complete DESPATCH SYSTEM

FIELD SURVEY

ENGINEERING

PRODUCTION

INSTALLATION

Save weeks or months of delay!

By delivering and installing your complete finishing system *weeks or months* ahead of most schedules, Despatch Engineers offer you a valuable and timely service. **Your products will not only reach the market sooner, but they'll have the kind of finish that only an ultra-modern system can provide.**

WHY PROMPT DELIVERY IS POSSIBLE

To provide fast, competent service like this, particularly in a highly specialized field, requires an unusual engineering organization. Here is what Despatch offers:

1. Largest Engineering Staff in the industry. There are over 110 experienced Resident Engineers and Field Engineers, every one a picked specialist! Offices from coast to coast. Your finishing needs are exhaustively analyzed to the last detail. Assures correct selection, design and performance of all equipment.

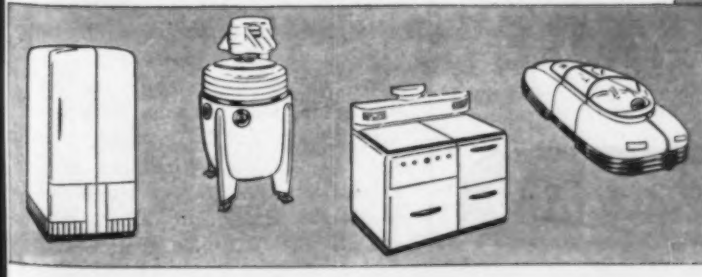
2. Huge Production Facilities with one of the largest, most up-to-date plants in the industry. Ample floorspace, adequate stocks, tools, modern high speed machinery. Streamlined, efficient manufacturing methods. Makes it possible to get *your* job out fast!

3. Immediate Installation After Delivery. Eliminates a common source of delay. Competent Despatch Installation Engineers erect, coordinate and adjust your finishing system units for maximum efficiency in performance.

TAKE ADVANTAGE OF THIS SERVICE!

Our 43 years specialized experience will help you save time, reduce costs and get a complete Finishing System installed in your plant faster.

FINISH BAKING OVENS (Conveyor or Batch Type), SPRA-BONDERIZERS, DRYERS, AIR CONDITIONERS, SPRAY BOOTHS, CONVEYORS



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DESPATCH OVEN COMPANY MINNEAPOLIS 14 CHICAGO 1

DESPATCH OVEN COMPANY
619 S. E. 8 Street, Minneapolis 14, Minn.
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Yes! We're interested in PROMPT DELIVERY of Finishing System equipment, such as:

- ☐ BAKING OVENS
- ☐ DRYERS
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- ☐ AIR CONDITIONERS
- ☐ SPRAY BOOTHS
- ☐ Have your engineers survey our plant and recommend equipment for finishing such products as _____

Name _____ Title _____

Company _____

Address _____
(STREET) (CITY) (ZONE) (STATE)

1 2

ROLL ON
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Bearing BALLS

...and WIN
OVER FRICTION

For friction-free performance in heavy duty assemblies or light and intricate mechanisms, specify "ABBOTT" . . . Carry the load as planned.

UNINTERRUPTED PERFORMANCE

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THE ABBOTT BALL COMPANY HARTFORD 10, CONN. U.S.A.

ASM Chapter Holds One Day Technical Session

Pitttsburgh

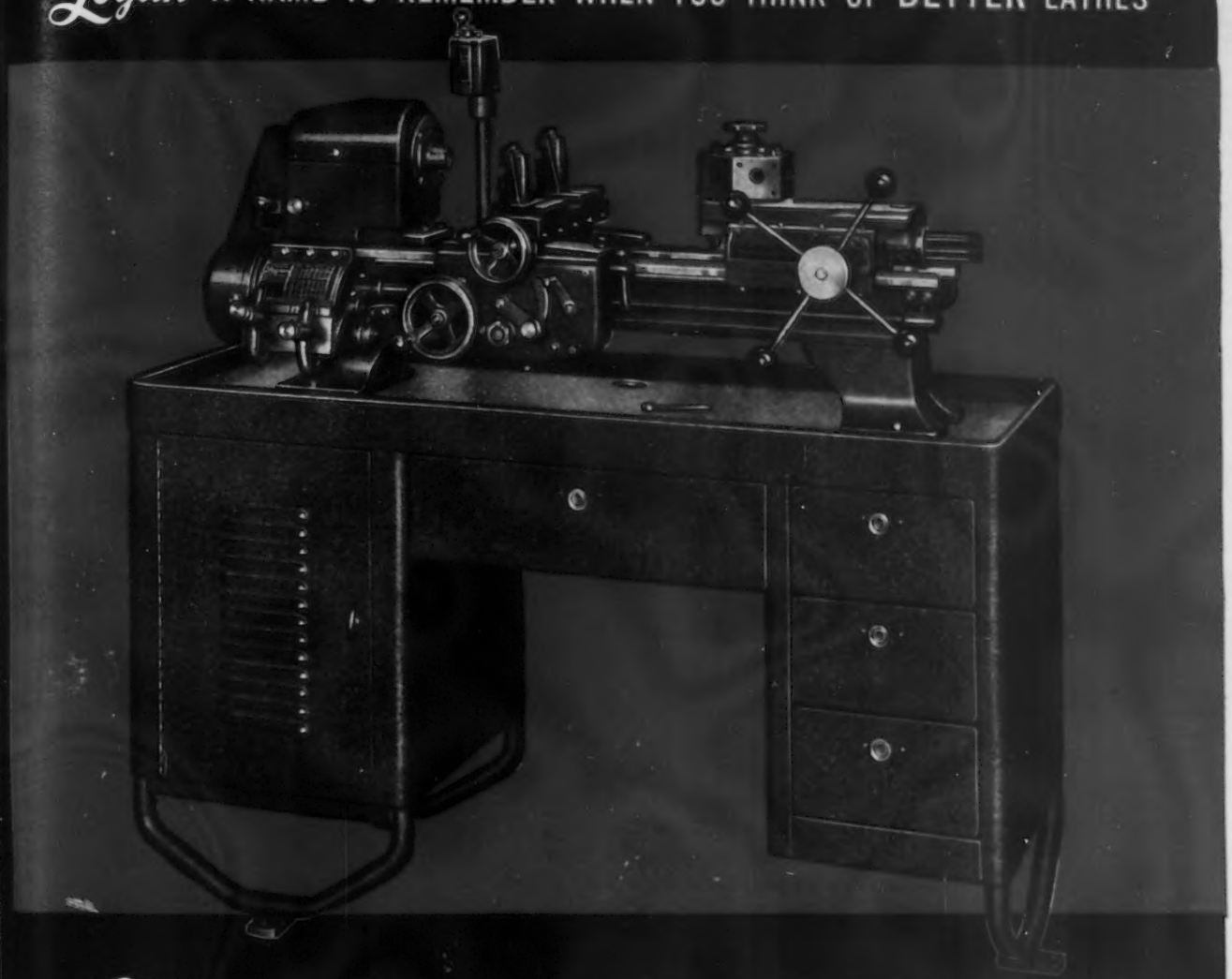
• • • **With the postponement** of the 1945 National Metal Congress, the Pittsburgh Chapter of the American Society For Metals arranged a one-day technical meeting at the Mellon Institute recently.

E. S. Rowland and S. R. Lyle, of Timken Roller Bearing Co., Canton, presented a paper entitled "The Application of Ms Points to Case Depth Measurements," and described a method for the measurement of case depth based upon the change in the martensite point temperature with variation in carbon content. The method was applied to nine commercial carburizing steels. Comparisons between the experimental Ms points derived from the investigation and those arrived at through calculation by means of published formulae were presented.

"Metallurgical Characteristics of Induction-Hardened Steel," by James W. Poynter, Army Air Forces, Wright Field, Dayton, showed that specimens of SAE 4340 steel, heat treated by induced high frequency (355,000 cycles) electric current and quenched have the same metallurgical characteristics as furnace heated and quenched specimens. The depth of hardening is augmented by increasing heating times (lower power imput) to produce the same surface temperatures with the same power input. Samples containing small carbide particles respond more readily to heat treatment than those with larger carbide particles. No evidence was found to indicate that induction heat heating results in more rapid solution and transformation rates. The paper pointed out that the effect of frequency on depth of hardening has been over-emphasized since the rate of heat flow has a definite effect on the depth of hardening. While evidence obtained regarding the so-called "superhardness" was not conclusive, it seemed likely, said Mr. Poynter, that the increased hardness is related to the presence of internal stresses and not to any difference in the metallurgy.

Several other papers were presented at the meeting, which were: "The Partition of Molybdenum in Hypoeutectoid Iron-Carbon-Molybdenum Alloys," by F. E. Bowman, Climax Molybdenum Co.; "Graphite in Cold Rolled Sub-Critically Annealed Hypoeutectoid Steels," by M. A. Hughes and J. G. Cutton, Carnegie-Illinois

Logan A NAME TO REMEMBER WHEN YOU THINK OF BETTER LATHES



New LOGAN TURRET LATHE

Precision Built For Sustained Accuracy, Speed, Versatility and Convenience

LIKE all Logan Turret Lathes, the new No. 845-2 turns out a volume and variety of accurate work at high speed and low cost. In addition, it is mounted on a compact, all steel, 4-drawer cabinet that provides convenient tool storage. Note the three-point base on which this cabinet stands, an exclusive Logan feature that gives firm footing on any floor.

The new No. 845-2 has all the Logan advanced design features that assure accurate work, versatility, and low cost maintenance through the years. The spindle turns on ball bearings. Self-lubricating bronze bearings are at 40 other vital points. The friction feed automatic apron travels on bed ways which are precision ground to within .0005" of parallelism. The heavy, pilot operated, hexagonal turret provides smoothness and accuracy on heavy cuts, and lengthens tool life as well. The underneath motor drive is completely enclosed in the left side of the steel cabinet. A standard Logan compound rest assembly and tailstock assembly are practical accessories to order with the lathe. They are interchangeable with the cross slide and turret, quickly converting the No. 845-2 into a screw cutting lathe.

SPECIFICATIONS COMMON TO ALL LOGAN LATHES . . . Swing over bed, 10½" . . . bed length, 43⅛" . . . size of hole through spindle, 25/32" . . . spindle nose diameter and threads, per inch, 1½"-8 . . . twelve spindle speeds, 30 to 1450 rpm . . . motor, ½ hp, 1750 rpm . . . ball bearing spindle mounting . . . drum type reversing motor switch and cord . . . precision ground ways, 2 V-ways, 2 flat ways.

N-1

LOGAN ENGINEERING CO. CHICAGO 30, ILLINOIS

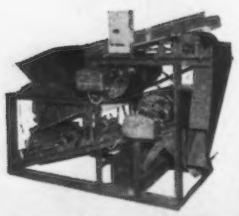
one of these DINGS MAGNETIC SEPARATORS

Dings Magnetic Drums
Cylindrical shell revolves around stationary magnet. Separation is automatic.

. . . will handle your job!

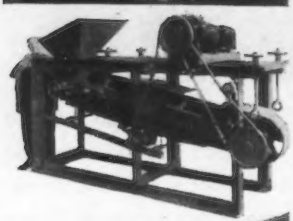
No matter how unusual or difficult a separating job you may have, there is a Dings High Intensity Separator that will handle it—with more positive results and less cost to you! This is made possible by the nearly 50 years Dings has spent developing magnetic equipment for the metal working industry. Write today for bulletins.

The Dings High Intensity Magnetic Pulley utilizes air-cooled construction and *bronze* spacer rings to provide complete, automatic separation. For use as head pulley in a belt conveyor system.

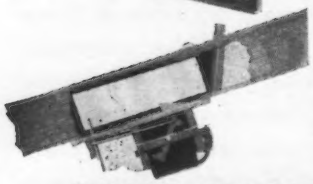


The Dings DA Magnetic Separator for separating ferrous and non-ferrous scrap. Two High Intensity Pulleys assure doubly clean separation. Feeder is reciprocating. Rubber covered idler adjusts gap between upper pulley and main conveyor belt.

Dings High Intensity Lifting Magnets feature a balance of copper wire and steel which is correctly proportioned to assure maximum lifting capacity with a minimum of weight and current input.



Dings High Intensity Type BN Separator. For separating mechanically entangled scrap. Combines magnets of alternate polarity with mechanical agitation to accomplish amazing results.



Dings High Intensity Type L Spout Magnets are designed for installation in chutes. Automatic gate discharges accumulated iron when current is interrupted.

DINGS MAGNETIC SEPARATOR COMPANY
516 E. Smith St.,
Milwaukee 7, Wisconsin

"Separator Headquarters"
Since 1899

Dings MAGNETIC SEPARATION HIGH INTENSITY

Steel Corp., Youngstown; "New Aluminum Alloys Containing Small Amounts of Beryllium," by R. H. Harrington, General Electric Co., Schenectady; "A Mechanism of the Surface Decarburization of Steel," by W. A. Pennington, Carrier Corp., Syracuse, N. Y.; "Temper Brittleness," by J. H. Hollomon, Watertown Arsenal, Watertown, Mass.; and "The Practical Application of Statistical Methods in a Quality Control Program," by W. T. Rogers, National Tube Co., Lorain, Ohio.

The paper "New Aluminum Alloys Containing Small Amounts of Beryllium," by R. H. Harrington, General Electric, indicated that new heat-treatable compositions are of two types: (a) Al-Cu-Be with the Cu and Be in the critical ratio of 7:1 and (b) Al-Cu-Be-Co with the Co and Be in the critical ratio of 6.5:1. These alloys develop superior strength properties as castings made by gravity-sand, centrifugal, and lost-wax methods, combined with high thermal stability and unusual oxidation-corrosion resistance. They also develop useful wrought properties so that it is possible for one representative composition to meet requirements in both fields. The most promising composition appears to consist of 3.8 pct Cu, 0.2 pct Be, 1.3 pct Co, and the balance Al.

Factory Employment In Buffalo Declines

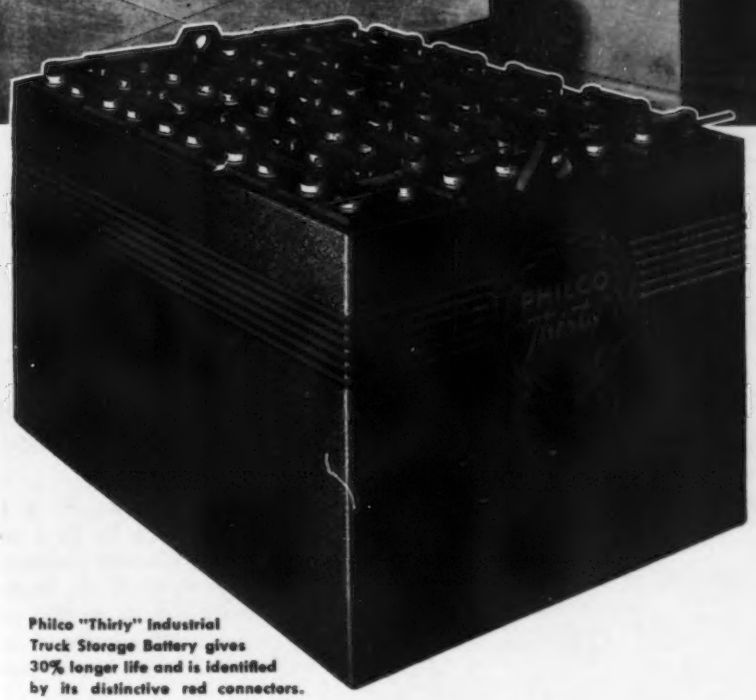
Buffalo

• • • **Factory employment** in 173 plants of this area dropped 20,422 from Aug. 15 to Sept. 15 to a total of 70,130, according to the Statistical & Research Bureau of the Buffalo Chamber of Commerce. This total was 40.7 pct below the 118,262 employed by these factories a year previous.

"The number of factory wage earners is 22.4 pct greater than in the prewar period of 1935-39 and payrolls are 122 pct greater," the report said.

Weekly payrolls of the plants slipped $1,277,133 during September to $3,505,666, being 45.9 pct below the $6,481,762 a week in September 1944. Workers average weekly earnings in the same plants were $49.99 against $52.82 in August and $54.81 a year ago.

The bureau's analysis said, however, that since Sept. 15 the layoff of workers "seems to have become stabilized and some plants are increasing the number of their workers.



Philco "Thirty" Industrial Truck Storage Battery gives 30% longer life and is identified by its distinctive red connectors.

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Tune in The Radio Hall of Fame, with Paul Whiteman and His Orchestra, Sundays, 6 P. M., EST; The Breakfast Club with Don McNeill, 9:45 A. M., EST, Monday through Friday—ABC (Blue) Network (Coast to Coast).

MODERN ELECTRIC INDUSTRIAL TRUCKS POWERED BY COST-SAVING PHILCO "THIRTY" STORAGE BATTERIES

Now you can get the kind of industrial trucks war experience proved the safest, most flexible and maintenance-free — ELECTRIC TRUCKS! And you can power your trucks with the greatest materials handling development since the fork-lift truck, itself—PHILCO "THIRTY", the Storage Battery with 30% longer life! Plan now for the big demands peace-time production will place on your materials handling equipment. Philco "Thirty" will give your trucks top capacity, *plus* savings in maintenance, depreciation and replacements. Write today for new catalogs giving specifications.

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PHILCO *Famous for Quality the World Over*

NO COMPROMISE WITH QUALITY

No matter how great the pressure for faster production, our plant managers have been instructed not to relax one iota in our system of checking, inspecting, and testing every chain of whatever type which we produce. Reconversion is proceeding rapidly. September civilian production exceeded August, and we are confident October will exceed September. We are hopeful that the spreading of our production will take care of most urgent necessities.

A. T. Morris
President

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AMERICAN CHAIN DIVISION
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In Business for Your Safety

Engineering Society Elects New Officers

New York

• • • **J. P. H. Perry**, vice-president of the Turner Construction Co., New York, was elected president of United Engineering Trustees, Inc., at a meeting held recently. Mr. Perry succeeds F. M. Farmer, vice-president and consulting engineer, Electrical Testing Laboratories, New York.

J. P. H. Perry

Mr. Perry has been closely affiliated with the United Engineering Trustees. He has been a director for the past ten years, was for three years vice-president and served on the engineering foundation board for three years.

Everett S. Lee, engineer-in-charge, General Electric Laboratories, Schenectady, continues as a vice-president.

Other officers elected were: Ralph M. Roosevelt, mining engineer, of New Canaan, Conn., vice-president; Albert Roberts, secretary-treasurer of the Minerals Separation North America Corp., re-elected treasurer; C. R. Jones, eastern transportation manager of Westinghouse Electric Co., re-elected assistant treasurer. John H. R. Arms, also secretary of the Engineering Foundation, was re-elected secretary.

United Engineering Trustees is a corporation set up jointly by the four national engineering founder societies—American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers and American Institute of Electrical Engineers.

Elects Regional Officers

Cleveland

• • • **Clayton Grandy**, president, Steel Products Warehouse Assn., Inc., has announced the election, by the Cleveland chapter, of the following officers: S. M. Friedman Nottingham Steel Co., chairman; Robert Cole, Ohio Steel & Supply Co., vice-chairman; David Moritz, Regent Steel Co., secretary; and H. Mervis, Singer Steel Co., treasurer.

Three new members of the RACO family . . .

RACO 8010 • RACO 9010 • RACO 10010

These are heavily coated all-position, reverse polarity electrodes for welding special high-tensile low alloy steels. Though new on the market their high quality is assured through our searching laboratory tests, and demonstrated on hundreds of practical jobs in shop and factory. When critical metals may be had for civilian goods, these electrodes will measurably assist you to meet post-war competition.

We will be glad to send you samples of RACO 8010, 9010 and 10010. Just write—

These electrodes comply with A.W.S. A.S.T.M. Specifications A233-45T, E8010, E9010, E10010.

The REID-AVERY COMPANY

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SINCE 1919 PRODUCERS OF ARC WELDING ELECTRODES AND WELDING RODS

Standard Euclid Cranes are available in sizes, types and spans to meet well over 90% of all material handling requirements.

Having been developed through several decades of specialized experience they embody design and construction that assures maximum service life with minimum operation and upkeep expense.

Standardized manufacturing assures interchangeability of parts and effects economies that assure the utmost value to purchasers.

Standard Euclid Cranes are available in capacities of 3, 5, 7½, 10, 15, 20 and 25 tons in various spans consistent with their size and power.

It may be definitely to your interest to install a Euclid *standard* crane. Write for catalog.

THE EUCLID CRANE & HOIST COMPANY

1361 CHARDON RD.
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Northwest Seeks To Develop Coals For Carbon Production

New York

• • • **Oregon coals for** industrial carbon production will be studied by Oregon State College researchers under the terms of a cooperative agreement with the Bonneville Power administration, according to Dr. Paul J. Raver, administrator. This is the first of a series of similar industrial research projects which will be undertaken jointly by Northwest educational institutions and the Bonneville Power administration.

Research work will be conducted under the direction of Dr. G. W. Gleeson, Dean of engineering at Oregon State College, and John N. Carothers, Chief of Bonneville's industrial analysis section. Studies will include investigation of the possibility of removing sufficient ash from Coos Bay coal to produce a coke satisfactory for smelting operations at a cost competitive with other sources of smelting coke.

Outlining the Bonneville Power administration's interest in utilization of Northwest coals for production of coke, Ivan Bloch, Chief of Bonneville's industrial and resources development division, pointed out "Our work with Oregon State College on this project is part of a broad program of research being undertaken in cooperation with universities and colleges in Oregon, Washington and Montana to develop new power markets in industries soundly based on the region's natural resources."

CC Ratings for Iron Foundry Industry Announced by WPB

Washington

• • • **CC ratings will** be assigned where necessary to maintain or expand production of malleable and grey iron castings, including cast iron soil pipe, the WPB has announced.

This action which is necessary to overcome a reported threatening shortage of these products, WPB pointed out, will enable producers to acquire capital equipment, construction materials, production materials and MRO.

Ratings for capital equipment will be assigned where (1) delivery cannot be obtained on an unrated basis and the equipment will result in a

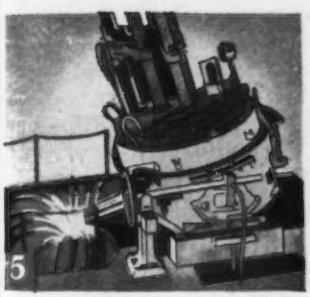
What will they cook up next?

You make alloys by "cooking" several metals together.

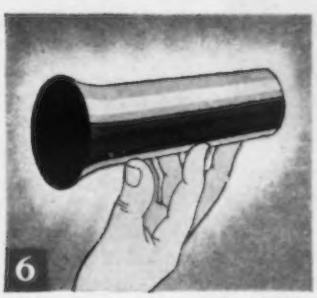
For example, you go to Africa and dig up some rare ore.

Then, you zip over to Turkey and dig up another kind . . .

. . . and push off for India for a third type. Next . . .



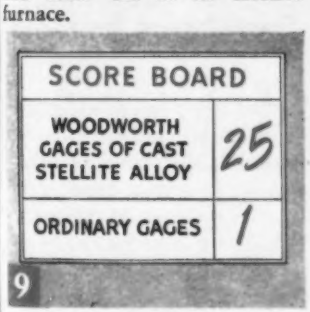
. . . you mix 'em exactly right and cook 'em in an electric furnace.



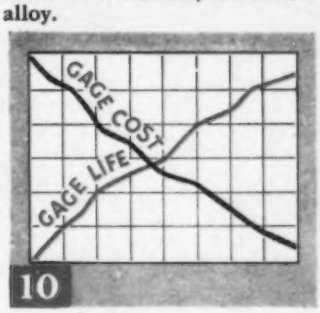
What have you got? STELLITE! A wonderful, useful new alloy.

N. A. Woodworth and Stellite engineers put their heads together.

Result! Long-wearing and corrosion-resistant GAGES.



Woodworth Gages of Stellite Cast Alloy *outwear steel 25 to 1.*



They increase gage life many times—reduce gaging costs.

And, *they won't rust or corrode,* in storage or in use.

Woodworth Gages made with Stellite set production records!

What Woodworth research means to industry

PIONEERING in the use of splendid new materials like Stellite is almost an everyday occurrence at Woodworth.

Here's why.

Every Woodworth product must conform to this basic research and manufacturing policy . . . *to make only products which will benefit industry through increased production and reduced costs.*

Since Stellite makes certain Woodworth products more efficient, it is being used. But, if tools and gages made out of *fragments of the moon* were required to speed up production and lower costs, our engineers would strive to find a way to furnish them.

Our always-try-to-make-it-better attitude should be of real help to industries preparing for the coming scramble for post-war markets.

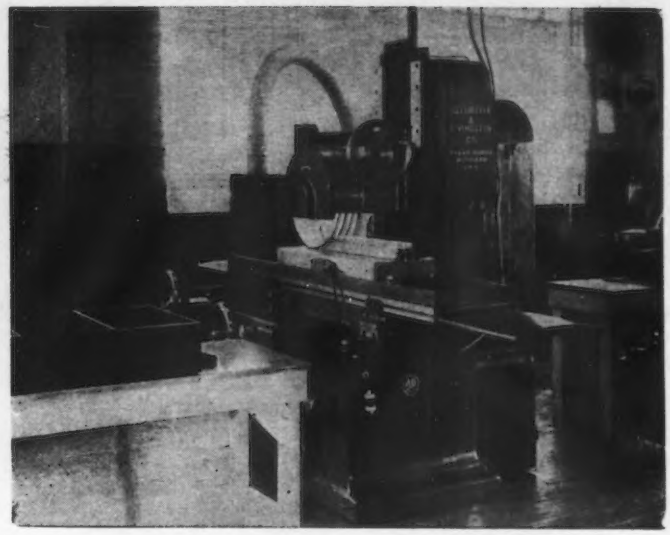
ACCURACY YOU W CAN TRUST

WOODWORTH

N. A. WOODWORTH CO., SALES DIVISION, 1300 E. NINE MILE ROAD
DETROIT 20, MICHIGAN

PRECISION GAGES
PRECISION MACHINED PARTS
PRECISION TOOLS

GRAND RAPIDS



Here is a Grand Rapids No. 55 Motor Driven Precision Tool Room Type Hydraulic Feed Surface Grinder on a strictly production job in the plant of one of our large electrical manufacturers.

Note that the machine is equipped with special spindle carrying four 18" diameter grinding wheels.

Many of these machines are furnished with 20" diameter grinding wheels to permit the grinding of dies with guide pins in position.

THESE MACHINES FEATURE

ONE PIECE COLUMN AND BASE CASTING
PATENTED MOVEMENT OF WHEEL HEAD
BIJUR ONE SHOT LUBRICATING SYSTEM
TWO USABLE SPINDLE SPEEDS
PORTABLE MOTOR DRIVEN COOLANT SYSTEM
TABLE SPEEDS UP TO 125 F.P.M.

IF YOU ARE INTERESTED IN SURFACE GRINDERS WHICH COMBINE TOOL ROOM ACCURACY WITH PRODUCTION SPEEDS, SEND FOR BULLETIN GL101

GALLMEYER & LIVINGSTON CO.
200 STRAIGHT AVE., S.W.
GRAND RAPIDS 4 MICHIGAN

substantial increase in production; (2) the equipment is needed to replace operating equipment in danger of imminent breakdown.

Construction materials orders may be rated where procurement on an unrated basis is impossible and where required for construction of new foundries or expansion or modernization of existing foundries where increased production will result. However, CC ratings will not be assigned for construction in areas where other foundries are curtailed due to lack of labor unless the new facility can be operated without an increase in labor requirements, WPB said.

Production materials and MRO orders will be given ratings where they cannot otherwise be secured and are needed to maintain minimum economic production in the foundry.

The CC rating will be denied where it appears that the item for which the rating will be used is available but under different terms of sale or from a supplier other than the applicant's customary source.

Number of Termination Stocks to Be Removed Show Large Increase

Washington

• • • **With the peak** volume of plant clearances expected before Jan. 1, 1946, the number of termination inventories to be removed from contractors' plants increased sharply from 4400 in April 1945 to 15,300 in September, according to the report by the Director of Contract Settlement submitted Oct. 31.

During the quarter ended Sept. 30, contractor owned inventory valued at $367 million (cost value) was removed or disposed of by the government compared with $200 million in the preceding quarter. The bulk of the inventories removed, it was pointed out, related to contracts terminated prior to VJ-Day.

Nearly all cases of inventory removals are completed within 60 days following contractors' requests, only 7 pct of the 21,000 completed during the third quarter having required more than 60 days exclusive of those cases where the time limit was waived. There were 14,000 clearances completed in 40 days or less and of the 16,000 requests pending at the end of the quarter, less than 3 pct was over 60 days old.

Factors which have heretofore retarded clearances have been largely eliminated, the report stated, and in-

NOW!

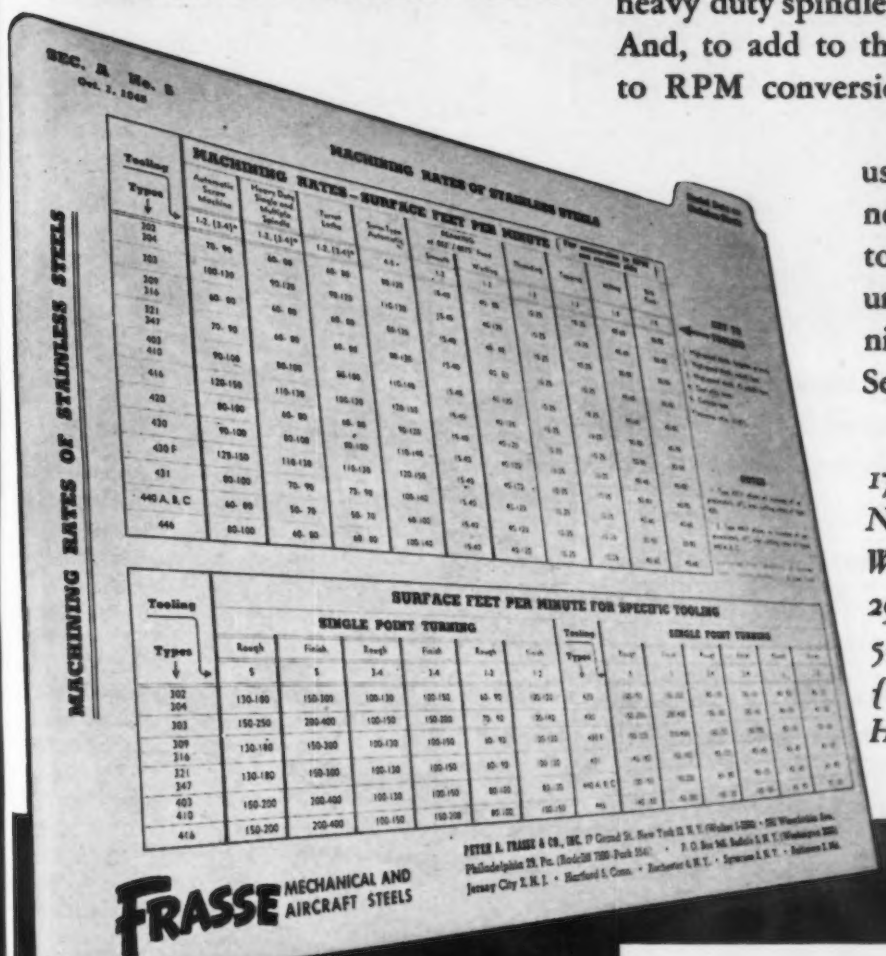
"STAINLESS" MACHINING RATES AT YOUR FINGERTIPS

Here's another Frasse help for stainless steel users: a table of recommended machining rates for 18 stainless types... for 10 separate operations... with specific tooling data — all condensed in one easy-to-use, quick reference chart!

This new Frasse chart shows for *each stainless grade*, recommended rates for turning, threading, milling, tapping and drilling...with high-speed, cast alloy or carbide type toolings. Turning rates are detailed to cover automatic, heavy duty spindle, turret and Swiss-type lathes. And, to add to the chart's usefulness, a SFM to RPM conversion table is included.

If you use or contemplate using stainless, you'll find this new chart...like Frasse inventories and technical counsel... unusually helpful in your planning, production or purchasing. Send for your free copy today.

Peter A. Frasse and Co., Inc., 17 Grand Street, New York 13, N. Y. {Walker 5-2200} • 3911 Wissahickon Ave., Philadelphia 29, Pa. {Radcliff 7100-Park 5541} 50 Exchange St., Buffalo 3, N.Y. {Washington 2000} • Jersey City, Hartford, Rochester, Syracuse, Baltimore.


SEC. A No. 5
Oct. 1, 1945

MACHINING RATES OF STAINLESS STEELS

MACHINING RATES OF STAINLESS STEELS

MACHINING RATES—SURFACE FEET PER MINUTE

SURFACE FEET PER MINUTE FOR SPECIFIC TOOLING

SINGLE POINT TURNING

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Please send me, without obligation, a copy of your new data chart Sec. A, No. 5—'Machining Rates of Stainless Steels'

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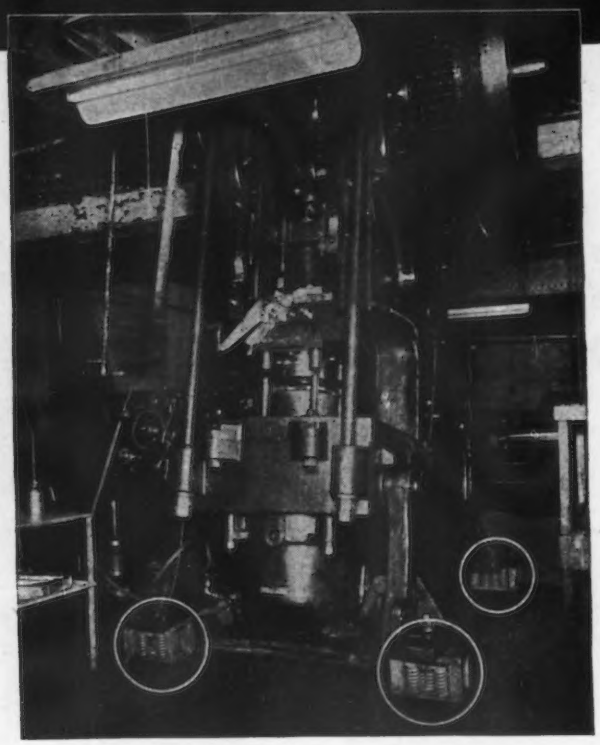
Now is the Time to Isolate Costly Punch Press Vibration



Four Korfund Type SL/H Vibro-Isolators effectively absorb the shock from this Bliss 100 Ton Capacity Press

You can't operate punch presses without vibration. Whether you realize it or not, uncontrolled vibration takes a constant toll in building damage, machine breakdowns, accidents, spoiled work and lowered employee efficiency.

But there is no reason why you can't be protected from vibration. Vibration can be isolated completely—and economically—through Korfund Vibration Control.

And the logical time to take advantage of the simple, sure results of Korfund Vibration Control is while presses are shut down during your reconversion period.

Ask for a Korfund Vibration Control Engineer to recommend the proper isolators for your equipment. We have representatives in principal cities. In the meantime, ask for Catalog H-600.

KORFUND
VIBRATION CONTROL

THE KORFUND COMPANY, Inc., 48-35 32nd PL., LONG ISLAND CITY 1, NEW YORK

ventory scrap determinations have been speeded up by increasing the number of RFC scrap consultants from 1000 to 3000.

Notwithstanding the large number of requests, government-owned equipment has been removed from contractors' plants speedily. Of the 4400 clearances completed during the quarter, it was pointed out, fewer than 3 pct required more than 60 days and more than 75 pct was completed within 40 days or less. Of the 2700 requests still pending Sept. 30, only 3 pct had been pending more than 60 days and the clearance work had been completed in most of these cases. The peak volume of plant equipment removals is expected before Jan. 1, 1946.

Requests Release Of Enemy Data to Aid U. S. Reconversion

New York

• • • **A huge mass** of vital scientific and industrial information obtained from enemy sources is still withheld from American industry, although much of it is being made available to Allied nations, the American Chemical Society declares in an appeal to John W. Snyder, director of the Office of War Mobilization and Reconversion, for the prompt release of the data in the United States.

"Thousands of reports of scientific, industrial and technological processes and developments in enemy countries now rest in the files of various government departments and in repositories abroad," Dr. Charles L. Parsons, secretary, pointed out. "In this huge mass of material is information which will accelerate reconversion, create new industries and make additional jobs for returning veterans and released civilian war workers.

"We understand that much of this material is being made available to our allies," Dr. Parsons told Mr. Snyder. "It would be regrettable if they were afforded advantages not accorded to American industry, which should be free from handicap in the postwar competition."

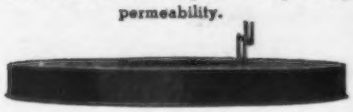
Recalling that President Truman, by executive order, has set up a procedure for the release of scientific information, and expressing confidence that the government "expects ultimately to make these reports available," Dr. Parsons stressed the need for speed in view of the urgent problems of reconversion and of re-employing war veterans.

A NEW E&M ALL-WELDED CIRCULAR LIFTING MAGNET

Streamlined design—nothing to catch on car sides.

Bottom view showing heavy pole shoes welded securely in place.

Special low-carbon steel magnet-housing having high permeability.



Continuous welds at the outer and inner edges seal the coil-case into the magnet-housing.

Heavy ribs strengthen plate and absorb blows due to impact when magnet is dropped on stockpile.

Center pole of wear-resisting, high-permeable steel, accurately machined for snug fit with magnet-housing. Outer pole-shoe ring of tough steel having both wear-resisting and high permeability qualities.

THIS ADVANCED DESIGN OFFERS IMPORTANT ADVANTAGES:

GREATER LIFTING CAPACITY because (1) elimination of outer pole shoe bolt-recesses permits *full diameter coil* and (2) welding insures *permanent contact* between magnet-housing and the pole shoes.

PROTECTION AGAINST MOISTURE getting into the magnet-winding because it is *hermetically sealed by continuous welds.* Suitable for underwater salvage work—in cooling pits—and other applications where moisture is excessive.

HIGH TEMPERATURE INSULATION. All sizes of this SW Magnet use strap copper wound on a mica-insulated spool. The insulation between turns is asbestos tape impregnated with a new *thermo-setting compound—No. 282,* The coil, in its metal-enclosed case, is also filled with No. 282 and baked to set the compound. In this form, No. 282 does not melt, yet is resilient.

Write for booklet 900, giving complete description.

The ELECTRIC CONTROLLER & MANUFACTURING CO.

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Niagara Aero After Cooler Protects Air Processes from Moisture Damage

Industries requiring dry compressed air need the Niagara Aero After Cooler. It provides cleaner, drier air for pneumatic tools, spray guns, sand and shot blast equipment, air cleaning nozzles and situations where air is introduced into materials in process.

The Niagara Aero After Cooler is based on the evaporative cooling principle. It does not consume cooling water and thus pays for itself quickly from savings in water bills. The patented "Balanced Wet Bulb" method assures the lowest air temperature, and controls exactly the jacket water temperature.

Write for Niagara Bulletins 96 and 98 for further information. Protection of air tools from moisture damages and saving in repairs makes the Niagara Aero After Cooler worth investigating.

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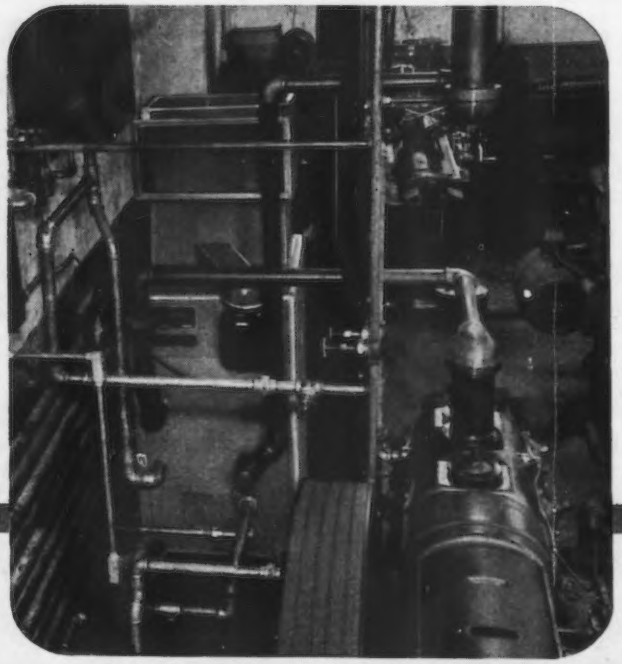

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HUMIDIFYING • AIR ENGINEERING EQUIPMENT

Earnings Reports . . .

Pittsburgh

• • • **National Steel Corp.** reports net earnings after all charges, including provision for depreciation and depletion, interest charges and federal taxes, for the quarter ending Sept. 30, 1945 of $2,027,502. This compares with net earnings of $2,667,515 reported in the third quarter of 1944.

Net income for the nine months ending Sept. 30, 1945 was $8,910,673, which compares with $8,080,974 for the first nine months of 1944.

No adjustment has been made with respect to the unamortized cost of war facilities, nor to reflect a lower effective federal tax accrual for the six months ended June 30, 1945 as a result of a possible reduced rate of earnings for the year as a whole. Any required adjustments will be made at the year-end.

National Acme Profit

Cleveland

• • • **Because of strikes at companies** supplying National Acme Co., company operations are being slowed down and third quarter net profit is reported at $278,940, or 56c a share, compared with $354,650, or 71c a share in the third quarter of 1944. Net profit is after provision of $1,511,100 for federal taxes on income, estimated refund on renegotiation, postwar adjustments and general contingencies. Provision for these purposes in the corresponding quarter last year was $2,827,000.

Company directors declared a dividend of 50c a share on common stock, payable Nov. 20 to shareholders of record Nov. 6; a similar amount was paid in previous quarters of this year.

Hanna Co. Net Increases

Cleveland

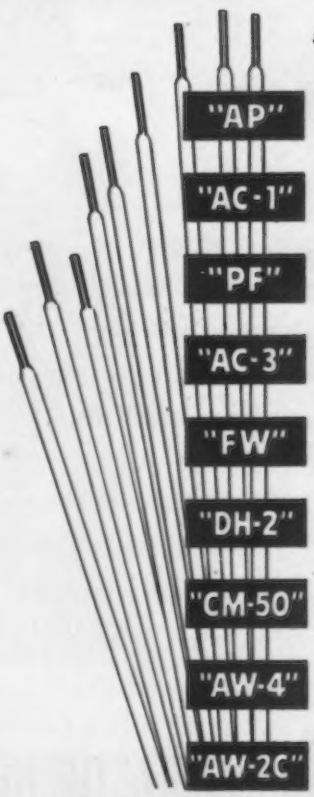
• • • **M. A. Hanna Co.**, coal, ore, dock and vessel operators, report net profit for the third quarter of 1945 of $1,338,410 after all charges, including Federal tax provision of $230,020 and depreciation and depletion of $913,768, which includes accelerated amortization of certain war facilities. The profit is equal after preferred

LET HIM HELP YOU

Choose the *Right* Electrode for Welding Mild Steels

The P&H representative knows arc welding. He's a specialist who lives with welding problems . . . who knows how to help you save time, save money and insure the best welding results through the proper selection of electrodes for every type of job.

Today, a staggering amount of time and money is wasted through misapplications. Don't let it happen in your shop. Whatever your mild steel welding work may be, you'll find the correct sizes and types of electrodes in the P&H line to answer every need. The quick and easy way to be sure, on this or any other welding problem, is to call in your nearest P&H representative. He brings you the experience of one of the world's largest *makers* and *users* of all types of welding electrodes. He is ready to help you without cost or obligation. Ask him to call.



A Few P&H Electrodes For Mild Steel Applications

"AP"	AWS — E-6010 (DC Reverse Polarity)
"AC-1"	AWS — E-6011 AC and DC (Straight or Reverse Polarity)
"PF"	AWS — E-6012 AC and DC (Straight Polarity)
"AC-3"	AWS — E-6013 AC and DC (Straight or Reverse Polarity)
"FW"	AWS — E-6020 AC and DC (Straight or Reverse Polarity)
"DH-2"	AWS — E-6020 AC and DC (Straight or Reverse Polarity)
"CM-50"	AWS — E-7011 AC and DC (Straight or Reverse Polarity)
"AW-4"	AWS — E-10012 AC and DC (Straight or Reverse Polarity)
"AW-2C"	AWS — E-10020 AC and DC (Straight or Reverse Polarity)

P&H

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We make metal parts and assemblies in quantity...also engineer, design and develop.

THE experience, equipment and co-operation that produced 9,000,000 precision bomb fuzes in thirty months and won us five citations for excellence in war production are now available to help you on problems of metal parts manufacturing, assembly work, or engineering and development.

For twenty-seven years we've designed and manufactured parts and equipment in the automotive, aviation, industrial and consumer fields. Our facilities include large automatic screw machines and chuckers for volume production to close tolerances.

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Subsidiary of Bendix Aviation Corporation

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dividends to $1.21 a share on common.

In the third quarter last year net profit was $1,210,015, or $1.09 a common share, while tax provision amounted to $285,602 and depreciation was $518,469.

Net profit for nine months of 1945 was $3,337,463, equal to $2.97 on common, and compared with $3,078,777 or $2.59 a share, in the corresponding period of 1944. Directors have declared the regular quarterly dividend of $1.0625 a share on the $4.25 cumulative preferred stock, payable Dec. 1 to stockholders of record Nov. 15.

American Rolling Mill

Middletown, Ohio

• • • **Consolidated net** earnings of the American Rolling Mill Co., for the quarter ended Sept. 30, were $1,460,795 after all charges, including excess profits tax, normal income tax, and surtax. This amounts to 33c per share on common stock compared with a consolidated earnings for the same quarter in 1944 of $916,350 equal to 14c per share.

To End Terminations

Chicago

• • • **The Chicago Ordnance** District made final settlement on 190 contract termination cases during the period from Oct. 15 to Oct. 31, Col. John Slezak, district chief, said today. This reduces the district's backlog of unsettled cases to 712 as of the end of last month.

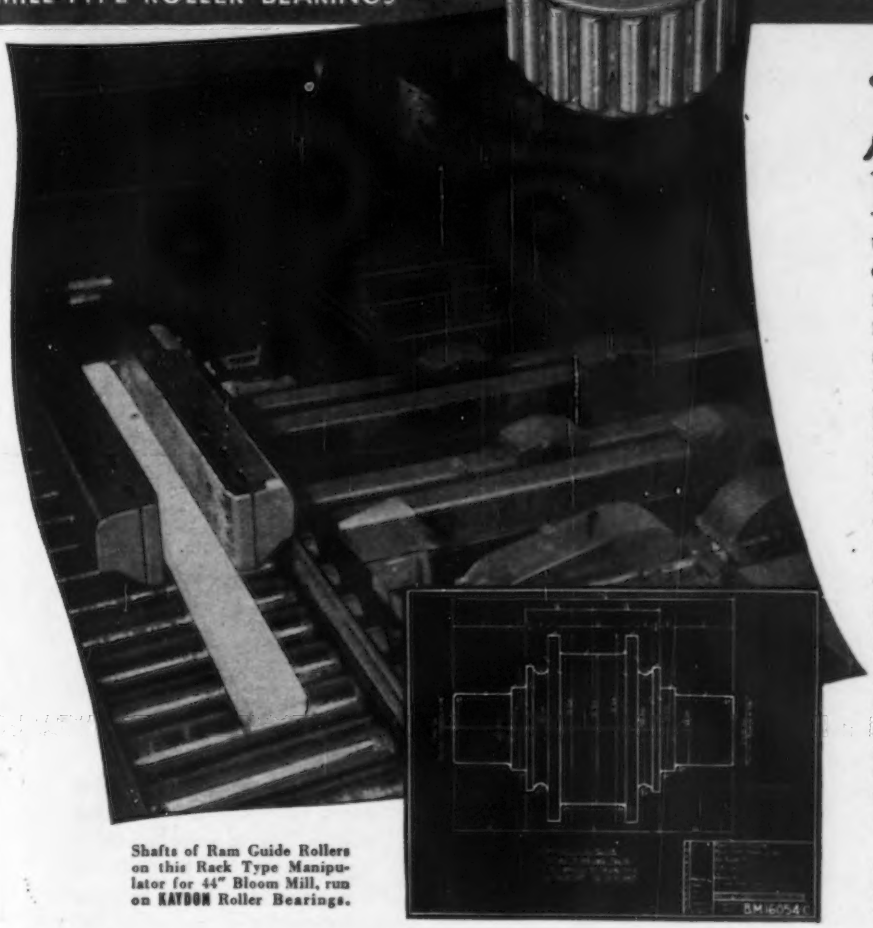
Col. Slezak stated that companies had speeded up greatly in submitting inventories and claims to the district during the recent period. He said that the district now lacks only 187 inventories from contractors compared with 373 on Oct. 15, while the number of claims yet to be received has been reduced to 282 from 488.

However, he declared that if the district was to achieve its goal of 97 pct final settlements by the end of the year, it was imperative that the remaining inventories and claims be submitted in the immediate future.

Col. Slezak said that his organization had settled 518 termination cases since Sept. 1. Of the 712 cases still remaining to be settled, 51 are over four months old.

Contact KAYDON *of Muskegon*

FOR ALL TYPES OF BALL AND ROLLER BEARINGS 4" BORE TO 120" OUTSIDE DIAMETER



Shafts of Ram Guide Rollers on this Rack Type Manipulator for 44" Bloom Mill, run on **KAYDON** Roller Bearings.

Hot and Heavy Loads for KAYDON *Bearings...*

IT takes mighty rugged high-precision bearings to stand up under terrific heat and heavy loads of white-hot steel billets passing over ram guide rollers of a rack-type manipulator in a 44" Bloom Mill, as shown here. Big, husky **KAYDON** W-228 Mill Type Roller Bearings (see dimensions above) . . . engineered for load capacity of 137,000 lbs. at 100 RPM... are performing successfully, under extremely high temperatures, with rams traveling 1700 feet every hour of the day.

That is typical of the many tough jobs **KAYDON** Bearings are "taking in stride". **KAYDON**, specializing in engineering and production of all types and sizes of ball and roller bearings from 4" bore to 120" O.D., also offers complete facilities for atmospheric controlled heat treating, flame hardening, precision heat treating, salt-bath and sub-zero conditioning and treatment, microscopy, physical testing, and metallurgical laboratory services.

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Counsel in confidence with **KAYDON**. Capacity is available now for production of all types and sizes of **KAYDON** Bearings.

KAYDON

KAYDON *Types of Standard or Special Bearings:*
Spherical Roller • Taper Roller
Ball Radial • Ball Thrust
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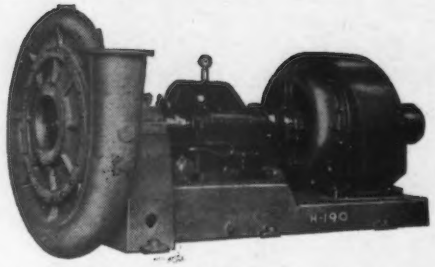
MUSKEGON · MICHIGAN

New in Name . . . Old in Experience

• Without air blast, we'd have no iron or steel. Vast amounts are whirled by blowers to blast furnaces, Bessemer converters and foundry cupolas. Air is equally important in heat-treating, annealing and other manufacturing processes.



Whether you need the 17,000 CFM which this centrifugal blower delivers, or only 10 CFM, Roots-Connersville can supply it from either standard or specially designed units. Ask for details.

Acceptance of Roots-Connersville blowers by the iron and steel industry dates back almost a century to our inception of the first rotary positive blowers. Our centrifugal blowers and exhausters are also widely used in making iron and steel, as well as in manufacturing and distributing coke oven gas for various plant uses.

Outstanding performance of R-C equipment is constantly being demonstrated in almost every industry. Typical applications are:

Sugar refining
Scavenging Diesel engines
Neon sign manufacturing
Tunnel ventilation
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The *dual-ability* of Roots-Connersville to engineer and build suitable equipment accounts for its reputation for long, dependable performance. This experience is at your service for moving air, gas or liquids at moderate pressures, in any volume. Call on us without obligation.

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ROTARY POSITIVE AND CENTRIFUGAL BLOWERS • EXHAUSTERS • BOOSTERS
LIQUID AND VACUUM PUMPS • METERS • INERT GAS GENERATORS

Immediate Withdrawal Of Controls on Gray Iron Foundries Urged

Chicago

• • • **Immediate withdrawal** of all government controls from gray iron foundries was asked by W. L. Seelbach, president of the Gray Iron Founders' Society, Inc., before that organization's peacetime production conference here recently.

W. L. Seelbach

He asserted that such action was vital to raising production from the 10 million ton level estimated for this year to meet reconversion demands. He asked renewed efforts to solve the foundries' manpower problem, and estimated that with sufficient manpower to achieve capacity production a level of 19 million tons of gray iron castings annually could be reached.

The bulk of the conference program was devoted to research, cost methods, industrial relations and working conditions and control methods.

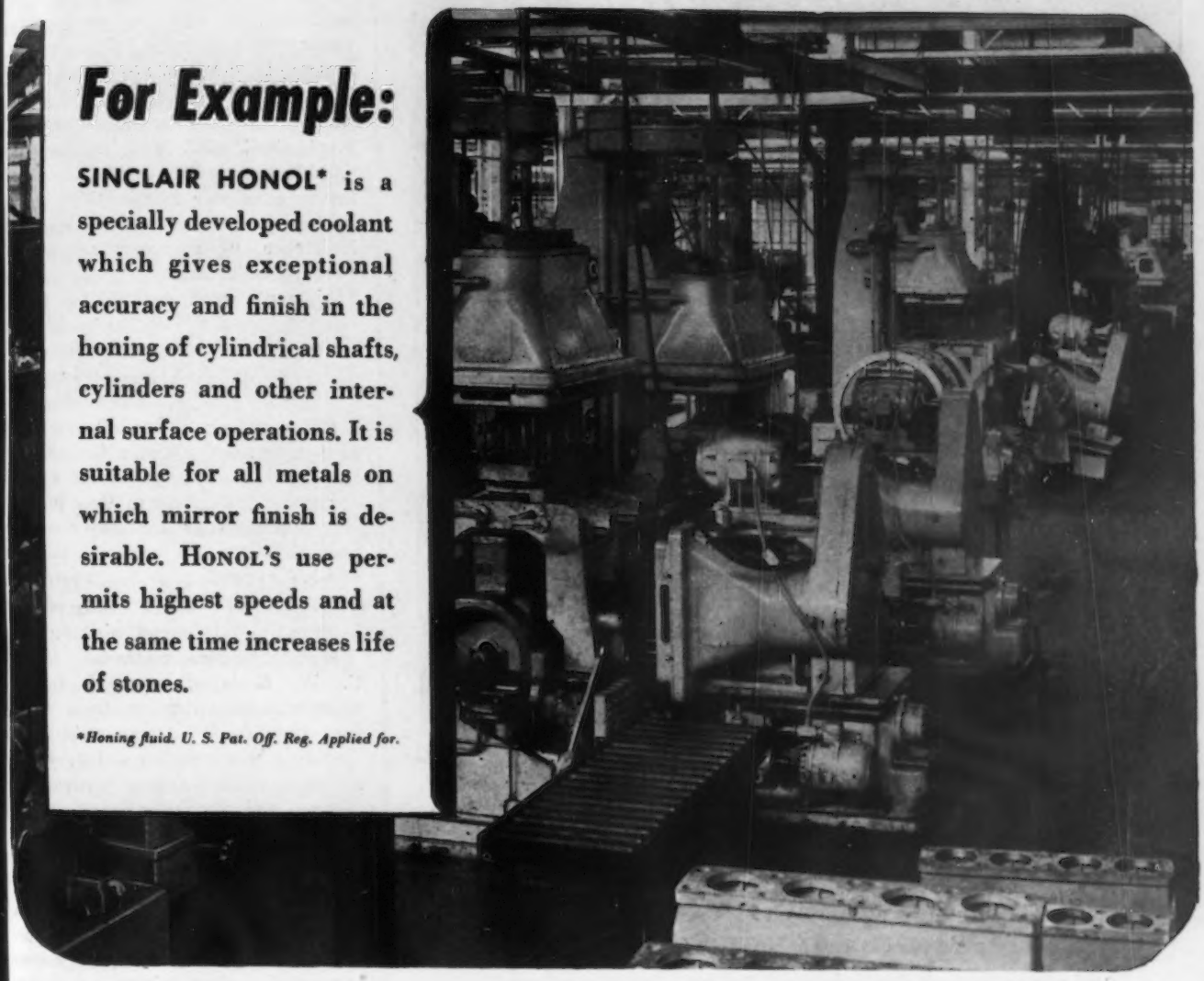
Howard F. Taylor of the Naval Research Laboratory, Washington, D. C., who will be the society's first associate research fellow for two year's study at Massachusetts Institute of Technology, declared that quality standards now unknown to most foundrymen must be achieved in order to maintain the place of gray iron in the consumer goods market. Optimum surface excellence, dimensional accuracy, internal soundness and greater strength and ductility will be demanded, he said.

"The solution to the time and expense involved in conducting basic research lies in government appropriations, collective or individual industrial grants, liberal scholarships and endowments or an effective combination of all," Mr. Taylor asserted.

He revealed that the Navy is initiating a broad gray iron research program to study the fundamental defects of gray iron castings.

He listed as principal fields in which research should be conducted (1) the need for larger risers which he said were necessary for perfectly sound castings; (2) determination of stress relieving cycles; (3) use of in-

SINCLAIR has the Answers to Your Shop Problems . . .



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**Honing fluid. U. S. Pat. Off. Reg. Applied for.*

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SINCLAIR provides a complete line of cutting and grinding fluids, both straight cutting oils and soluble oils. Have you a particular problem in maintaining production, or determining the correct cutting fluid for a specific operation? Sinclair consultants skilled in cutting operations and application of appropriate coolants are available to you.

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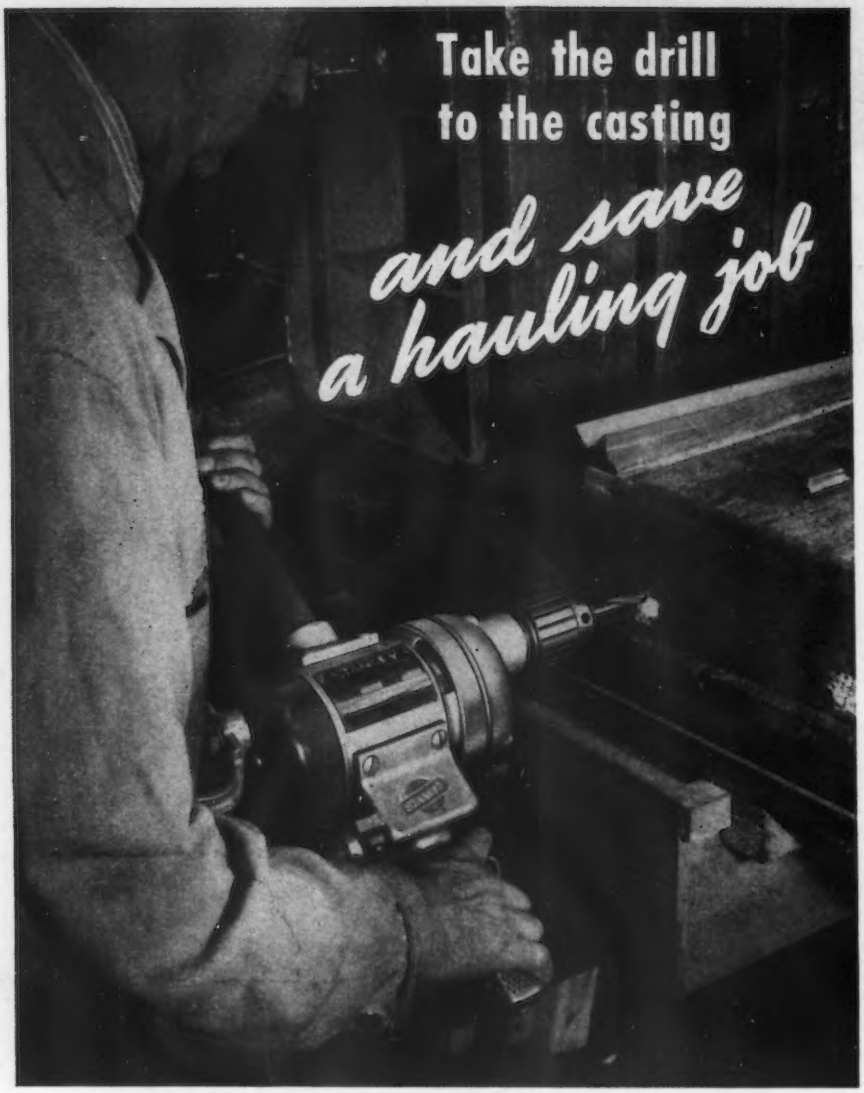

Use precious man-hours for drilling . . . not just for hauling and heaving. Take one of these Stanley Heavy Duty Electric Drills to the casting, point it at the punched center and pull the trigger. Comfortable grip-switch handles give quick, easy control. Holes are drilled clean and true . . . and a time-wasting, man-wasting handling job is eliminated.

Stanley Heavy Duty Electric Drills operate from standard power lines, AC or DC current . . . sizes all the way from ¼" to 1". Write for Electric Tool Catalog, Stanley Electric Tools, Division of The Stanley Works, New Britain, Connecticut.

STANLEY

STANLEY ELECTRIC TOOLS

spection tools; (4) effect of melting conditions upon metal quality; (5) graphitization, chill characteristics, segregation, and control of microstructure together with principles and control of inoculation; (6) heat treatment to improve microstructure; (7) sand practices with intensive attention to improved naturally bonded sands or blending of natural and synthetic sands.

John E. Linabury, foundry engineer, General Motors Corp., outlined factors affecting quality control. He emphasized the need for accurate specifications and mutual understanding in consumer relationships. Good pattern and equipment control with insistence upon accurate patterns, proper adjustment of mechanical equipment, good quality equipment, healthful working conditions, accurate fixtures and gages, and definite specifications for materials are, he said, essential.

Mr. Linabury outlined the means of achieving uniformity of melting, but urged the foundrymen to avoid specifying tensile strength in specifications, contending that that quality was not a comprehensive measuring stick for gray iron. Sand control, cooling and cleaning department requirements were detailed.

Plant conditioning was discussed by C. W. Schwenn, general foundry superintendent, Brillion Iron Works, Inc., Brillion, Wis., who said that a well-kept plant as an aid to hiring, an hours control system, proper ventilation, and mechanical slag disposal were among factors enabling his firm to achieve an excellent labor-management relationship and secure a high level of employment. He cited a daily tonnage increase of 37.5 pct, a substantial reduction in scrap percentage and machine shop rejects, a reduction of approximately 8 manhours per ton of good castings and improved customer good will as results of the program.

Eric E. Schwantes, director of training, International Harvester Co., McCormick Works, Chicago, speaking on an industrial relations panel, cited the need of proper selection of employees, a proper induction program, on-the-job, vestibule and apprentice training, and service to employees as necessary personnel policies.

"Industry must condition employees if they expect to reduce labor turnover and grievances. Certainly the untrained employee not indoctrinated in company policies cannot expect to be as valuable as one who has

Cut those POSTWAR Threading COSTS

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STANDARD THREAD MILLING CUTTERS

New {

- 60% increase in blank sizes carried in stock
- 52 Basic Shell type sizes
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All types available in virtually any thread form, including Acme, Buttress, National, Modified Whitworth, etc.

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All types available either topping or non-topping and with full length threads or with plain milling sections.

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All shank types available in Jarno, Morse and B & S tapers.

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To speed delivery for reconversion, decrease costs and increase your thread accuracy, specify DETROIT standards by Number.

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TAPPING MACHINES
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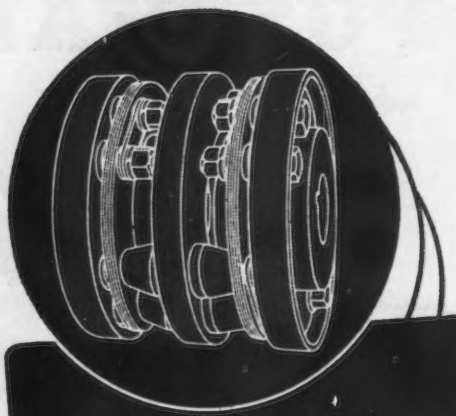
Flexible COUPLINGS

....are specified by engineers, wherever 100% Operating Efficiency is demanded



TYPE DBZ

TYPE DSM

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THOMAS *Flexible* **COUPLINGS**
provide for
Angular and Parallel Misalignment as well as Free End Float . . .
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BACKLASH, FRICTION, WEAR and CROSS-PULL
NO LUBRICATION IS REQUIRED!

The Thomas All-Metal Coupling does not depend on springs, gears, rubber or grids to drive. All power is transmitted by direct pull.

TYPE DBZ-D
HIGH SPEED HEAVY DUTY FLOATING SHAFT TYPE FLEXIBLE COUPLING

WRITE FOR COMPLETE ENGINEERING CATALOG

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

thoroughly inoculated with the above principles," he stated.

Mr. Schwantes described the Harvester Co.'s experience in training 300 Jamaicans employed by his plant.

Speaking on the topic "Recruiting and Training Engineers For the Foundry Industry", David D. Henry, president, Wayne University, laid down three steps by which the industry might enter into successful competition for young engineers. These were (1) assistance to educators, vocational counselors, and others influencing young men vocationally, in demonstrating the opportunity for engineers in foundry work; (2) development of a program of interpretation which will clearly and effectively present the professional opportunities in foundry engineering; and (3) enabling schools and colleges to present a laboratory to students which is modern in every detail and which represents best current foundry practice plus improvements to which the profession aspires.

The conference's business session included discussion of recent revisions to maximum price regulation No. 244 and further prospective changes in the regulation. New officers elected were: president, H. L. Edinger, Barnett Foundry & Machine Co.; vice-president, George H. Alten, Alten Foundry & Machine Works; secretary Howard A. Stockwell, Barbour Stockwell Co.; and reelected as treasurer, Homer Britton, Cleveland Foundry Co. Directors elected were: A. R. Enquist, Connecticut Foundry Co.; E. C. Hoenicke, Eaton Mfg. Co. (Foundry Div.); J. O. Jackson, Jackson Industries, Inc.; C. R. McGrail, Texaloy Foundry Co.; C. T. Milles, C. H. Milles Foundry Co.; and E. B. Smith, Brake Shoe & Castings Div., American Brake Shoe Co.

P.E.I. Elects Officers

Pittsburgh

• • • **At the annual meeting** recently held in Pittsburgh, Richard H. Turk, executive vice-president of Pemco Corp., Baltimore, was re-elected president of the Porcelain Enamel Institute of Washington. Three vice-presidents were also elected: H. R. Spencer of the Erie Enameling Co., Erie, Pa.; W. A. Barrows of the W. A. Barrows Porcelain Enamel Co., Cincinnati; and J. T. Penton of the California Metal Enameling Co., Los Angeles, Calif.

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Materials Handling Equipment

Mercury, a pioneer in the materials handling field and the originator of "The Trackless Train" System (tractors and trailers) has over 33 years experience designing, manufacturing and installing handling equipment. This experience is your guarantee of high efficiency and dependability in all Mercury lift trucks, tractors and trailers.

Elevating Platform Trucks

Mercury Elevating Platform Trucks are available in the following models:

"Junior" Models: Low and high lift types. 4000 lbs. capacity. Compactly designed for work in confined areas.

"Senior" Models: Low and high lift types. Rugged design, 4000 lbs. capacity.

"Standard" Models: Low and high lift types. 6000 lbs. capacity. Sturdy, rugged design.

Fork Trucks

"Jeep" Sit Down, Center Control Fork Truck. 2000 lbs. capacity. Compact design affords easy manipulation in confined areas.

"Yak" Center Control Fork Truck. 4000 lbs. capacity. Rugged design.

"Yank" Center Control Fork Truck. 6000 lbs. capacity. Designed for tough continuous service.

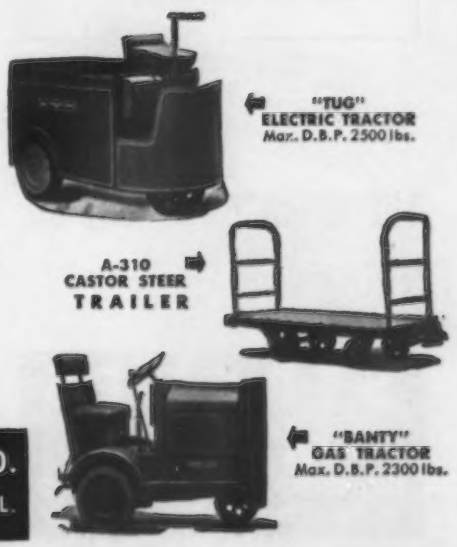
Tractors—Trailers

"Tug" Electric Tractor: A powerful compact tractor available in "twin-wheel", and "4-wheel" models, medium or heavy duty.

"Banty" Gas Tractor: The most compact tractor made, yet develops a draw bar pull in excess of 2000 lbs. Thousands now in use.

Trailers: Available in castor or 5th wheel steer, platform or side dump types.

For detailed information on Mercury tractors, trailers, and lift trucks, request Bulletin 7-11.



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Strenes METAL
WILL SPEED UP
YOUR TOOLING PROGRAM

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Also write almost any of our prominent automotive, tractor, farm implement, refrigerator or stove manufacturers. They can and will confirm our claims that Strenes cast-to-shape drawing and forming dies will:

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Stay in service longer between redressings and out-last dies of ordinary metal.

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Sole Producer.
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STRENES METAL
DRAWING AND FORMING DIE METAL

Construction Steel . . .

New York

• • • **Fabricated steel awards** this week included the following:

5800 Tons, Framingham, Mass., General Motors Co. assembly plant, to Bethlehem Steel Co., Bethlehem, Pa., through Kahns, Albert Associates, engineers.

3000 Tons, Elyria, Ohio, building, to Bethlehem Steel Co., Bethlehem, Pa.

2000 Tons, Geneva, Ohio, American Fork & Hoe Co., Special Sections, to Carnegie Illinois Steel Corp., Pittsburgh.

1993 Tons, Coal barges, Wheeling Steel Corp., to St. Louis Shipbuilding & Steel Co.

1445 Tons, Memphis, Tenn., caissons for Mississippi River bridge, Merritt Chapman Scott, contractors, to Virginia Bridge Co., Roanoke, Va.

1300 Tons, near Milford, Mich., for five buildings at General Motors Proving Grounds, to Whitehead & Kales Co., Detroit, through Argonaut Realty Div., Detroit.

1230 Tons, Battle Creek, Mich., warehouse, Kellogg Co., to Duffin Iron Works, Chicago.

1000 Tons, Kankakee, Ill., A. O. Smith Corp. plant, to Wisconsin Bridge & Iron Co., Milwaukee.

1000 Tons, Richmond, Va., store building of Miller & Rhodes, Doyle & Russel, contractors, to Virginia Bridge Co., Roanoke, Va.

801 Tons, Cranford, N. J., building, to Harris Structural Steel Co.

713 Tons, Orange, Tex., nylon salt plant addition, du Pont de Nemours & Co., to Consolidated Steel Corp., Los Angeles.

690 Tons, Indianapolis, Ind., plant additions, to Central States Bridge & Structural Co., Indianapolis.

674 Tons, Brecksville, Ohio, research building, to Ingalls Iron Works.

650 Tons, Elgin, Ill., office and factory building, to Joseph T. Ryerson & Sons, Chicago.

650 Tons, Forest Park, Ill., building addition, Mississippi Valley Steamship Co., to American Bridge Co., Pittsburgh.

650 Tons, Sacramento, Calif., Continental Can Co. plant to American Bridge Co., San Francisco.

521 Tons, various locations, radio towers, to Bethlehem Steel Co., Bethlehem, Pa.

508 Tons, New York, Immaculate Conception School, to Bethlehem Steel Co., Bethlehem, Pa.

500 Tons, Mexico City, Mex., factory building, to Mississippi Valley Structural Steel Co., Melrose Park, Ill.

500 Tons, Aurora, Ill., mill building, All-Steel Equipment Co., to Joseph T. Ryerson & Son, Inc., Chicago.

450 Tons, Appleton, Wis., highway bridge over Fox River, to Bethlehem Steel Co., Chicago.

410 Tons, Bridgewater, N. J., manufacturing building, to Bethlehem Steel Co., Bethlehem, Pa.

348 Tons, Columbus, Ohio, warehouse, to J. T. Edwards & Co.

340 Tons, Elyria, Ohio, factory building addition, to Fort Pitt Bridge Works, Pittsburgh.

340 Tons, Chicago, mill buildings, Ingersoll Steel & Disc Div., to Henry Gremp & Co., Chicago.

338 Tons, Houston, Tex., factory building, Campbell, Lourie, Lautermilch Corp., successful bidder not known.

338 Tons, Texas, bridge, Texas Highway Department, successful bidder not known.

312 Tons, Goldville, S. C., mill addition, Joanna Textile Mills, to Belmont Iron Works.

288 Tons, Schenectady, N. Y., tool house, to Bethlehem Steel Co., Bethlehem, Pa.

287 Tons, Dutch Guiana, building and tanks, Aluminum Co. of America, successful bidder not known

280 Tons, Memphis, Tenn., warehouse, Seth E. Giem, to Fischer Steel Corp.

265 Tons, Raleigh, N. C., revenue building, McDevitt & Street Construction Co., to Virginia Bridge Co., Roanoke, Va.

261 Tons, McKeevey, N. Y., bridge, E. G. De Lia & Co., to American Bridge Co., Pittsburgh.

260 Tons, Cincinnati, fuel flats, to St. Louis Shipbuilding & Steel Co.

255 Tons, Nitro, W. Va., plant addition, American Viscose Corp., to Virginia Bridge Co., Roanoke, Va.

218 Tons, Minneapolis, Minn., research department addition, August Cederstand Co., to American Bridge Co., Pittsburgh.

213 Tons, Colombia, S. A., brewery additions, through U. S. Steel Export Co., to American Bridge Co., Pittsburgh.

198 Tons, Roanoke Rapids, N. C., slasher building extension, Rosemary Mfg. Co., to Belmont Iron Works.

196 Tons, Louisville, Ky., garage, F. W. Owens Co., to American Bridge Co., Pittsburgh.

140 Tons, Detroit, for cupola craneway extension at Cadillac division, to Whitehead & Kales Co., Detroit through Argonaut Realty Div., Detroit.

126 Tons, Shannon, Ga., picker room extension, Brigoton Mills Co., to Belmont Iron Works, Philadelphia.

105 Tons, unknown location, truss section for bridge, U. S. Steel Export Co., to Virginia Bridge Co., Roanoke, Va.

100 Tons, Macon, Ga., Fourth St. bridge, C. of Ga. Railway Co., to Virginia Bridge Co., Roanoke, Va.

Fabricated steel inquiries this week were as follows:

15,000 Tons, Memphis, Tenn., bridge across Mississippi River for Tennessee-Arkansas Highway Commissions, American Bridge Co., low bidder, but all bids rejected because estimates were said to have been exceeded by 25 per cent. It is understood new bids will be asked early next year.

2461 Tons, Sandy Hook, Md., Potomac River bridge.

1700 Tons, Le Flore Co., Okla., two Arkansas River bridges, Oklahoma State Highway Dept.

1517 Tons, Brawley, Calif., sugar factory, Holly Sugar Corp.

1100 Tons, Detroit, warehouse, Central Steel & Wire Co.

1000 Tons, Oakdale, La., Newport Industries naval stores extraction plant, Stone & Webster Engineering Co., Boston, engineers.

754 Tons, Milford, Mich., factory building, Upjohn Co.

700 Tons, New York, apartment house, City Investing Co.

685 Tons, Cleveland, meter repair building, East Ohio Gas Co.

629 Tons, San Jose, Calif., State highway bridge.

525 Tons, Dubuque, Iowa, fertilizer plant building, Virginia Coraline Chemical Corp.

500 Tons, Chester, Pa., Scott Paper Co., boiler installation, Stone & Webster Engineering Co., Boston, engineers.

500 Tons, Chicago, kiln shed, Chicago Brick Co.

500 Tons, Dayton, Ohio, building extension, McCall Corp.

417 Tons, Trenton, N. J., factory and office building, L. A. Young Steel & Wire Co.

400 Tons, Rocky Mt., N. C., warehouse, William Muirhead Construction Co.

NEWS OF INDUSTRY

400 Tons, Norfolk, Va., building extension, Norfolk Coca Cola Bottling Co.

400 Tons, San Francisco, Matson Navigation Co., office building, Swinnerton-Walberg, general contractor.

360 Tons, San Francisco, Apparel City.

309 Tons, Naugatuck, Conn., laboratory building, U. S. Rubber Co.

300 Tons, Grand Coulee, Wash., spillway face caisson, U. S. Bureau of Reclamation.

285 Tons, Saltville, Va., girder bridge, Mathieson Alkali Works.

279 Tons, Minneapolis, Minn., office, warehouse, and shop building, William H. Ziegler & Co.

265 Tons, Raleigh, N. C., revenue building, North Carolina State Highway Dept.

250 Tons, Massillon, Ohio, factory building, Canton Metal Decorating Co.

218 Tons, Minneapolis, Minn., research building, General Mills, Inc.

215 Tons, Mt. Kisco, N. Y., alterations to hospital building, Northern Westchester Hospital.

200 Tons, Oakland, Calif., Emporium-Capwell Co. addition.

200 Tons, Baltimore, kiln building, General Refractories Co.

200 Tons, Tarrytown, N. Y., dormitory building, Marymount College.

200 Tons, Brooklyn, N. Y., buckstays and framing, Brooklyn Union Gas Co.

160 Tons, San Leandro, Calif., Pacific Can Co., plant.

138 Tons, San Jose, Calif., State highway bridge.

111 Tons, Kingsport, Tenn., 100 x 130 building, Tennessee Eastman Corp.

109 Tons, Memphis, Tenn., mail building addition, Illinois-Central Railroad Co.

104 Tons, Chatham Co., N. C., two highway bridges, North Carolina Highway Dept.

100 Tons, Holyoke, Mass., incinerator.

100 Tons, Redding, Calif., nine gate frames, U. S. Bureau of Reclamation.

100 Tons, Berkeley, Calif., University of California Hess Hall.

100 Tons, Oakland, Calif., Fruitvale Cannery.

Reinforcing bar awards this week included the following:

3855 Tons, Cleveland, bars and wire rods, Champion Rivet Co., to Carnegie-Illinois Steel Corp., Pittsburgh.

300 Tons, Atlanta, Ga., newspaper plant for Atlanta Constitution, to Hall Steel Co., Atlanta, through Daniel Construction Co., Birmingham.

Reinforcing bar inquiries this week included the following:

1500 Tons, Tonawanda, N. Y., Eastern States Milling Corp., grain elevator (project reported Nov. 8, 1945, as 203 tons).

1000 Tons, Flint, Mich., Buick Motor Car plant.

900 Tons, Springfield, Ohio, concrete bars, Crowell-Collier Publishing Co., Austin Co., general contractor.

400 Tons, Sandusky, Ohio, concrete bars, New Departure ball bearing plant for General Motors Corp.

300 Tons, Detroit, Pontiac Motor building, O. W. Burke, Detroit, general contractor.

350 Tons, Detroit, Hudson department store warehouse.

350 Tons, Kankakee, Ill., Armstrong Cork Co. plant.

319 Tons, Mansfield, Ohio, Westinghouse Electric Corp. building.

250 Tons, Yountville, Calif., State Veterans Administration, mess hall.

200 Tons, Oakland, Calif., Tower Apartments.

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General Purpose
Dredging and Hard Digging
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Material Handlers
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Above types built in weights and capacities to suit your crane and job requirements.

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Being the largest exclusive manufacturer of metal sawing machines and blades, both hack saw and band saw type, we have the correct answer to your cut-off problems. Each MARVEL model has a distinct application, so write us and we will send our catalog, price and recommendation for the saw to fill your requirements most efficiently. MARVEL sawing engineers are also available to discuss and analyze your cut-off work. (Without obligation of course)

Mitre cutting is simple and accurate with the MARVEL Series 8 Band Saw. No change in position of work. No change in the saw column at any required angle up to 45° either right or left of vertical. Do not confuse with any other "band saw". There is no other machine like the No. 8 MARVEL.

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161 Tons, San Jose, Calif., State Highway bridge.

150 Tons, San Francisco, Apparel City.

150 Tons, Bedford, Mass., hospital administration building addition, bids close Dec. 4.

125 Tons, Providence, R. I., Meriden St., bridge.

105 Tons, Point Pleasant, W. Va., Baltimore & Ohio R. R., bridge.

100 Tons, Berkeley, Calif., University of California Hess Hall.

Sheet piling awards this week include:

800 Tons, Alpena, Mich., Huron Portland Cement Co., dock to Carnegie-Illinois Steel Corp., Pittsburgh.

Sheet piling inquiries this week include:

250 Tons and 300 Tons, Providence, R. I., Meriden St., bridge, Charles A. Maguire & Associates, Providence, engineers.

Foundries Need Recruits

Washington

• • • Job security and rapid upgrating of workers are the principal labor inducements with which the foundry industry expects to recruit additional manpower to offset current lagging castings production, J. D. Small, War Production Board Chief of Staff has announced. At the same time, WPB's Steel Division requested foundries to report all open capacity as soon as possible. Current castings production is now running at a 9,000,000-ton annual rate and must be lifted to about 12,000,000 tons annually to meet reconversion demands of the automotive, refrigeration, farm machinery, household appliance and other peacetime industries, Mr. Small said. Current order backlogs ranging to more than eight months at some foundries plus mounting reconversion demands insure workers in this industry a secure job for at least five years, according to WPB estimates.

The gray iron castings industry, it was stated, now employs about 260,000 workers, but 60,000 to 70,000 additional employees are required. Twenty thousand additional workers were said to be needed immediately. Thereafter, it was estimated, these foundries can employ additional workers at the rate of 15,000 men per month for the ensuing three months.

Those who wish to take advantage of this opportunity for good, permanent jobs in a basic industry should apply to their local foundries and the local USES offices, WPB officials reported.

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Made to specifications and the way you wish them.

Drop Forged Volz Clamp
for lifting any type of flat surfaced objects such as steel plates, barrels, angles, etc. They hold with bulldog tenacity.

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in all standard sizes, types, etc., but in only one quality — the best.

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of standard sizes.

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ACCURATE, HIGH SPEED SPRING PRODUCTION

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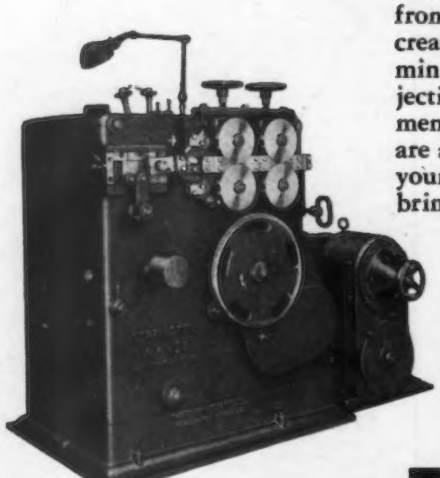
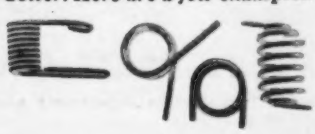
Speed and accuracy are fundamental qualities of Torrington Spring Coilers. Fourteen sturdily constructed models coil wire diameters from .003" to .750". Accuracy increases high production rates by minimizing hand inspection and rejections. Torsion and other attachments for special types of springs are available. A brief description of your spring coiling problems will bring our prompt, detailed reply.



Almost any useful spring can be made on a Torrington Spring Coiler. Here are a few examples:



THE TORRINGTON MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT

Survey Reveals First Employment Advance For Cleveland Area

Cleveland

• • • For the first time since VJ-Day, Cleveland's downward trend in employment has been halted, and industry has started on an upward swing in peacetime activity.

This encouraging note was sounded by the Cleveland Chamber of Commerce last week in announcing results of its monthly survey of 100 major industries just completed by J. W. Vanden Bosch, statistician.

Other statements from Mr. Vanden Bosch's report follow:

Continued employment gains during November seem assured with 33 companies planning to increase its forces and 26 companies expecting to maintain present levels throughout November. Only 6 manufacturing companies foresee further layoffs, some of which are to be only "slight" curtailments.

Total employment for the 100 companies covered by the survey stood at 92,098 as of Oct. 26. This compares with 91,325 at the end of September, or a gain of 773 workers. This survey, considered an accurate barometer of total industrial employment in Cleveland, represents 52 pct of all industrial employment in the city.

All groups, except food products, shared in the October advance. Fifty-four of the 100 companies showed moderate employment gains during the month, 29 declined and 17 operated without change.

A working week as reported by more than 80 companies averaged 43.7 hr in October, as compared with 43.9 in September. Just prior to VJ-Day, it was 49.2.

The average labor hiring rate at the end of October was 75.7¢, up one cent during the month. This is an all-time high, which reflects the adjustments of some of the lower rates which were frozen during the war period.

"The upward swing follows an 18 pct drop in August and an additional 2.7 pct decline in September," Mr. Vanden Bosch stated. "Although the October increase of eight-tenths of one per cent is comparatively small," he added, "it is evidence that the post-VJ-Day downward trend has been definitely halted. Cleveland industry is prepared now for peacetime volume. The only hazards confronting indus-

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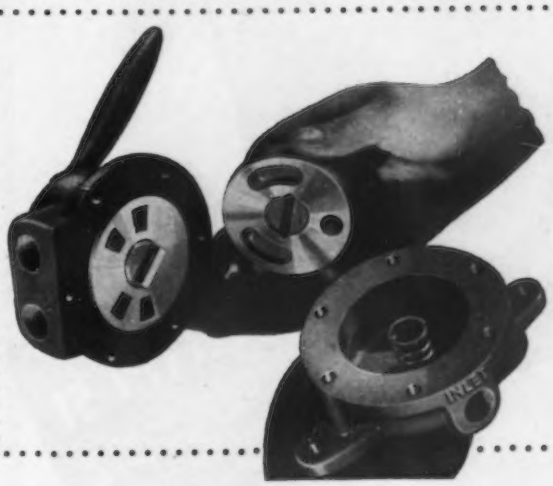

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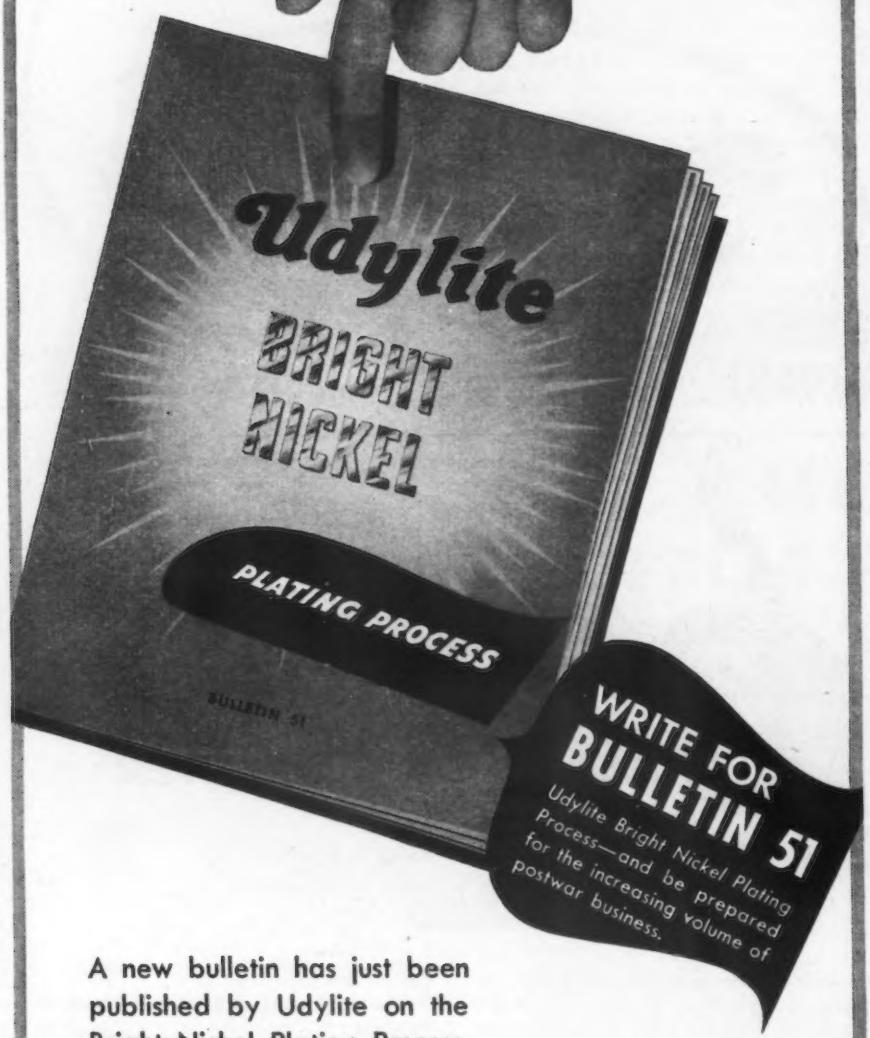

WRITE FOR BULLETIN 51

Udylite Bright Nickel Plating Process—and be prepared for the increasing volume of postwar business.

A new bulletin has just been published by Udylite on the Bright Nickel Plating Process.

In it are outlined the details of the process, its advantages, the equipment and supplies used, and the technical help which Udylite is prepared to furnish all users.

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try here are those arising from national labor and economic conditions.

"VJ-Day started an abrupt drop in employment, the index falling from 175.7 to 142.8 immediately after the end of the war, and continued downward to 139.7 by the end of September. The decline was relatively small when compared with many other industrial centers, and of exceedingly short duration. This is due largely to the great diversification of industry here, the almost complete absence of strictly wartime 'giants' and little or no reconversion problems."

Unemployment in the Cleveland area was set by the United States Employment Service at between 48,000 and 50,000. However, the total of all nonagricultural workers in this area has decreased to 499,950, from a July total of 553,200. In addition to those looking for work at present, 10,000 veterans are returning home every month.

In Canton, Ohio, the USES office placed only about one-fourth as many persons in jobs in October as it did in the same month last year, according to John M. Hayne, manager, who reported the number of job orders on file at the office has dropped 50 pct in the last 30 days.

Earlier, about 1000 persons jammed the office to file jobless benefit claims and register for work. About two-thirds of these were Timken Roller Bearing Co. workers, idle as the result of a 22-day old strike. Many demobilized veterans also were among the job seekers, Mr. Hayne said.

Mr. Hayne said October placements of 576 were 23 higher than in September, but 1657 below the number placed a year ago. Job orders stood 667 last week as compared with 1222 on Oct. 2. He disclosed that in October the office succeeded in placing only about 200 veterans out of 2000 who came to the office in search of employment.

In its first monthly report on conditions in the Canton area, the USES revealed that payrolls of 20 major firms dropped 3.6 pct between Sept. 1 and Oct. 15. However, these same firms expect to have a combined increase of 3.1 pct in their payrolls within four months from the date of the survey.

The USES report also showed that only about one-fourth of the 2000 job seekers referred to employers needing help were hired, and that jobless benefit claims are tending to decrease.

Scrap Institute Elects New Chapter Officers

New York

• • • **Benjamin Schwartz**, executive vice president of New York Commodities Corp., has been reelected president of the New York Chapter of the Institute of Scrap Iron & Steel. Mr. Schwartz was formerly the director general of the National Institute and was also chief of the scrap metals section of Foreign Economic Administration in Washington.

Samuel H. Bassow, of Bassow Bros., Bronx, was elected chairman of the executive committee. Other officers elected include the following: William Frost, first vice president, P. W. Bowers Co., New York; Charles J. King, second vice president, Charles J. King Scrap Iron & Steel Corp., Brooklyn; George Alper, treasurer, Queensboro Structural Steel Co.; Albert Raphael, secretary, Bassow Bros.

The executive committee, in addition to the officers, will consist of the following: Joseph A. Moskowitz, Samuel Sons Iron & Steel Co., Brooklyn; Harris Feistal, Charles Dreifus Co.; Herman Fradis, Schiavone-Bonomo Corp.; John Langon, Continental Iron & Steel Co.; Jack Weinstein, Independent Scrap Iron Corp., Brooklyn; William Hundt, Luria Bros. & Co.; Hess Noch, Luria Steel & Trading Co.; Robert Joseph, Commercial Steel & Chemical Co.; Richard Nathan, Co.

•

Cleveland

• • • **Abner L. Cohen** of N. Cohen & Sons Co., Cleveland, has been elected president of the Northern Ohio chapter of the Institute of Scrap Iron & Steel, Inc., for the coming year, to succeed David C. Holub of D. C. Holub & Co., Akron, Ohio.

Other officers of the chapter are: 1st vice-president, Jack Levand of Luria Bros. & Co., Inc.; 2nd vice-president, Manly R. Burgin of Summer & Co.; secretary, Joseph B. Horwitz of Joseph B. Horwitz Co.; and treasurer, Browne A. Shapero of Max Friedman Co., all of Cleveland.

David C. Holub was elected chairman of the executive committee. The other members of the executive committee are: I. B. Blumenstein of I. A. Barnett Co., Barberton; Paul H. Hamel of The By-Products Iron & Steel Corp., Cleveland; Paul Kulka of Kulka Iron & Metal Co., Alliance;

CHILLED SHOT DIAMOND GRIT

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More cleaning and less dust at less cost.

And, remember—any old size won't do.

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If cleaning grey iron, malleable iron, or steel drop forgings, we can save you money.

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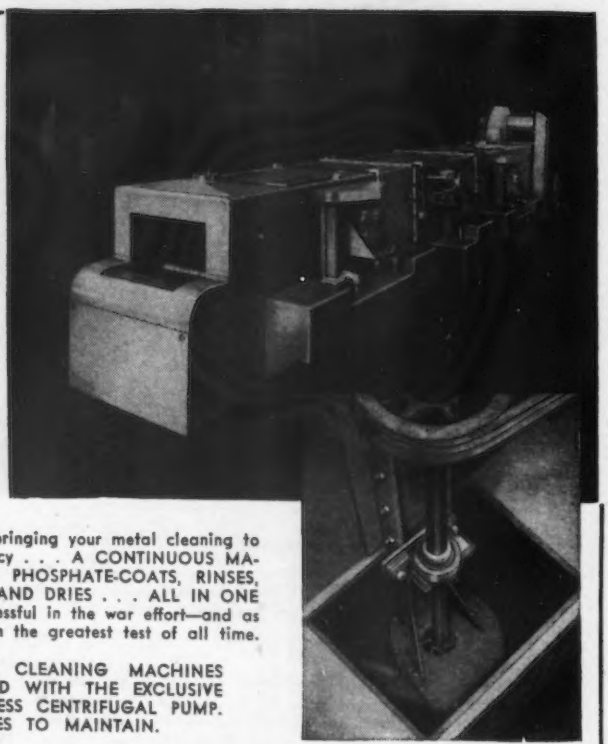

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Lewis Miller of Columbia Iron & Metal Co., Cleveland; S. H. Schachtel of Philip W. Frieder Co., Cleveland; B. E. Sims of Atlas Steel & Supply Co., Cleveland; Joseph H. Tyroler of Tyroler Iron & Steel Co., Cleveland; S. H. Urdang of A. Shaw Co., Cleveland; and Raymond W. Wilkoff of Apex Steel & Supply Co., Cleveland.

•

Detroit

• • • **Ben Kramer** of Kramer-Orloff Co., Detroit, has been elected president of the Michigan chapter of the Institute of Scrap Iron & Steel, Inc., for the coming year, to succeed Maurice A. Schlafer of Schlafer Iron & Metal Co.

Other officers are: 1st vice-president, Louis Brown of Joe Brown & Sons, Grand Rapids; 2nd vice-president, Jay Lenick of E. Lenick & Co., Saginaw; secretary, Mannie Fishman of Modell Iron & Metal Co., Detroit, and treasurer, Louis Freedman of Woodmere Scrap Iron & Metal Co., Detroit.

The members of the executive committee are: Edward Elk of Kasle Bros. Iron & Metal Co., Flint; Nathan Carroll of Monroe Scrap Material Co., Monroe; Harry Fisher of Fisher Iron & Metal Co., Muskegon; Harry Goldman of Riverside Scrap Iron & Metal Co., Detroit; Louis Goldman of J. S. Goldman Iron & Metal Co., Port Huron; Milton K. Mahler of Morrow Steel Co., Detroit; Maurice Schlafer of Schlafer Iron & Metal Co., Detroit; Gordon Skinner of Luria Bros. Iron & Metal Co., Detroit; Sam Rands of Grant Iron & Metal Co., Detroit, and Sol H. Young of Sol H. Young Iron & Metal Co., Cadillac.

•

Indianapolis

• • • **Frank Kilcline** of the Luntz Iron & Steel Co., Kokomo, Ind., has been elected president of the Indiana chapter of the Institute of Scrap Iron & Steel, Inc., to succeed Allison E. Falender of the Falender Iron & Metal Corp., Indianapolis.

Other officers of the Indiana chapter are: Vice-president, Maurice Epstein of Epstein Bros., Indianapolis; secretary, Harry Alpert of J. Solotken & Co., Inc., Indianapolis; and treasurer, Leo Cohn of Leo Cohn & Co., Indianapolis.

Members of the executive committee are: Wilford Borinstein of A. Borinstein, Indianapolis, Frank Cohen of Cohen Bros., Connersville; Allison

Falender of Falender Iron & Metal Co., Indianapolis; Sam Hurwich of Hurwich Iron Co., South Bend; Ben Kroot of The Joseph Kroot Co., Columbus; Meyer Ruchman of Indiana Rolling Mill Baling Corp., Fort Wayne; Meyer Sagalowsky of Sagalowsky Bros., Indianapolis; and Harold Weinstein of Calumet Iron & Supply Co. of East Chicago, Inc., East Chicago.

•

Cincinnati

• • • **Harry Goldberg of the Goldberg Iron & Steel Co., Columbus, was elected president of the Cincinnati Chapter at a meeting held in Cincinnati on Sept. 24. Mr. Goldberg, at present the vice-president, will succeed Abe Byer of the American Compressed Steel Corp., Cincinnati, as president.**

Other newly elected officers are: Vice-president, Ralph Kopelove of the Kopelove Iron & Metal Co., Dayton; and secretary-treasurer, Frank Miller of the David J. Joseph Co., Cincinnati. The executive committee will include: Emil Klempner of Klempner Bros., Louisville, Ky.; Joseph Mansbach of Mansbach Metal Co., Ashland, Ky.; Isadore Middleman of Middleman Iron & Metal Co., Cincinnati; and Edward Schlezinger of I. H. Schlezinger & Sons, Columbus.

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Buffalo

• • • **The western New York Chapter of the Institute of Iron and Steel Scrap, Inc., reelected officers and directors for the coming year. They are: president, Harry Markowitz, Syracuse; vice-president, Saul Frankel, Rochester; secretary-treasurer, Leo Chapin, Buffalo; and directors: N. H. Jacobs, Max Pressler and Joseph Maher, Jr., of Buffalo; Jack Rubenstein, Syracuse; and Saul Spiegel, Elmira.**

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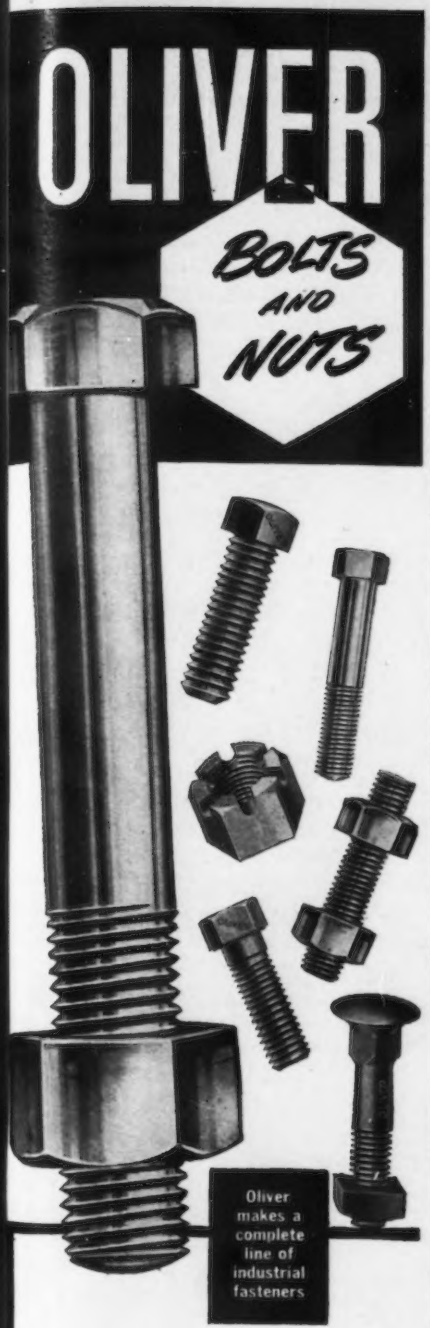
Birmingham

• • • **Moses A. Temerson of Charles Temerson & Sons, Tuscaloosa, Ala., has been elected president of the Southeastern Chapter of the Institute of Scrap Iron & Steel Inc., succeeding M. W. Breman of Breman Iron & Metal Co., Atlanta. Other officers who were elected include: First vice-president, H. T. Herndon of J. T. Knight & Son, Atlanta; second vice-president, Louis B. Cline of Cline & Bernheim, Nashville; third vice-president, Irving**



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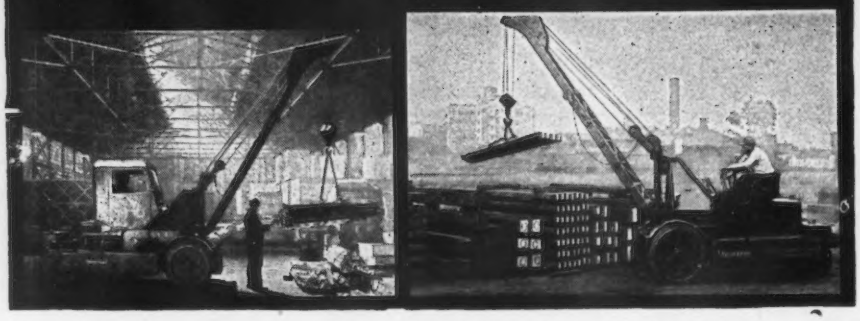

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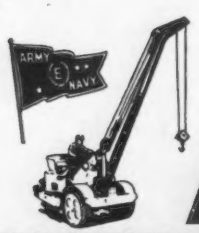
Agents in the Principal Cities



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NEWS OF INDUSTRY

Levin of Superior Iron & Metal Co., Jacksonville; and secretary-treasurer, John K. Travis of The Philip W. Frieder Co., Birmingham. The executive committee for the coming year will consist of: M. W. Breman of Breman Iron & Metal Co., Atlanta; J. B. Chinn of Hickman, Williams & Co., Birmingham; Nathan Filler of Jefferson Iron & Metal Co., Birmingham; J. B. Knight of J. T. Knight & Son, Columbus, Ga.; and M. W. Tenenbaum of Chatham Iron & Metal Co., Savannah.

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Seattle

• • • **Harry Schwartz** of the Alaska Junk Co., Seattle, has been elected president of the Pacific Northwest Chapter of the Institute of Scrap Iron & Steel, Inc., succeeding Jules Glant of the Pacific Iron & Metal Co., Inc., Seattle.

Other newly elected officers are: First vice president, Max Sidell of Seattle Iron & Metals Corp., Seattle; second vice president, Moe Michelson of Riverside Junk Co., Everett, Wash.; secretary, Earle Glant of Pacific Iron & Metal Co., Inc., Seattle; and treasurer, Harry Sidell of Seattle Iron & Metals Corp., Seattle. Jules Glant was elected chairman of the executive committee. Other members of the executive committee include: Leo Bloch of M. Bloch & Co., Seattle; Louis Dulien of Dulien Steel Products, Inc., Seattle; Harry Nieder of Nieder & Marcus, Seattle; Gilbert Rosenwald, Jr. of Dulien Steel Products, Inc., Seattle; and Carl Sternoff of Sternoff Metals & Iron Works, Seattle.

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ASM Elects Officers

Cleveland

• • • **Dr. Charles H. Herty, Jr.**, Bethlehem, Pa., was elected national president of the American Society For Metals at the annual meeting recently. Dr. Herty succeeds Dr. Kent R. Van Horn, assistant manager, Cleveland Research Div., Aluminum Corp. of America.

Other officers elected were: A. L. Boegehold, head of the Metallurgy Dept. Research Laboratories Div., General Motors Corp., Detroit, vice-president; Dr. H. K. Work, manager of research and development, Jones & Laughlin Steel Corp., Pittsburgh, treasurer; John Chipman, professor of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., and W. E. Jominy, chief metallurgist, Dodge Chicago plant, Chrysler Corp., Chicago, trustees.